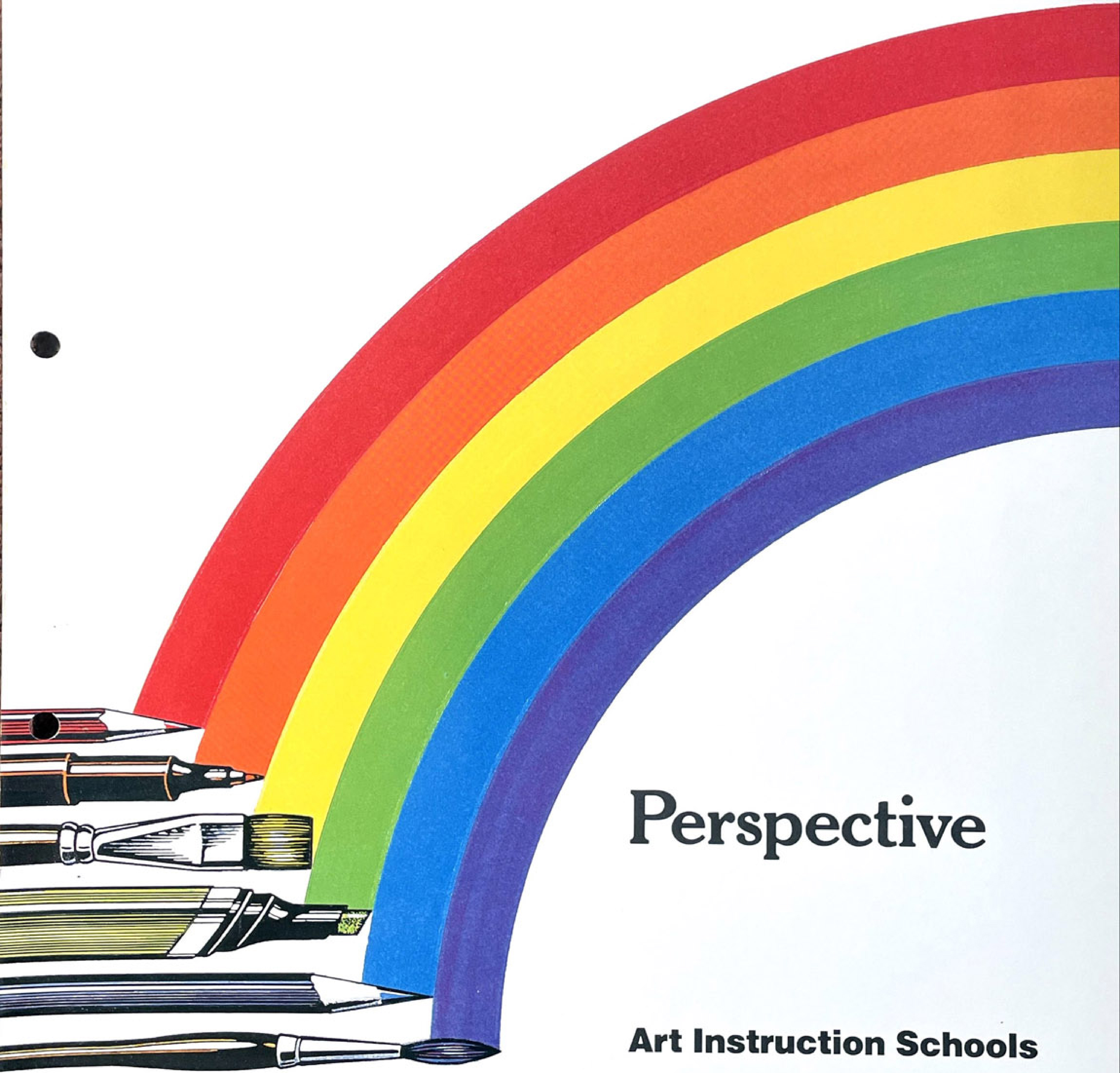


Perspective

Art Instruction Schools

Perspective

In most of the artwork you've been doing, you've been trying to give your subjects the appearance of realistic form and solidity. By making your subjects look solid, you were actually giving your pictures the illusion of depth, because solid objects are found only in three-dimensional space. And so, by giving depth to your artwork, you used perspective without even knowing it. Using perspective is nothing more than giving your drawings the illusion of realistic depth and distance.

Artists through the years have been challenged by perspective. Although man had very little understanding of how to render solid objects on flat surfaces, he developed other simple techniques, such as overlap, to give the illusion of space in his drawings. As art continued to develop, artists' knowledge of perspective grew right along with it. This was possible because they spent years training their eyes and hands to draw exactly what they saw. Eventually, the discoveries of these artists were brought together and simplified into the "rules" of perspective. These rules make realistic drawing much easier. And you can benefit from the studies of these men (some of the greatest artists of history) by learning some of these rules they developed.

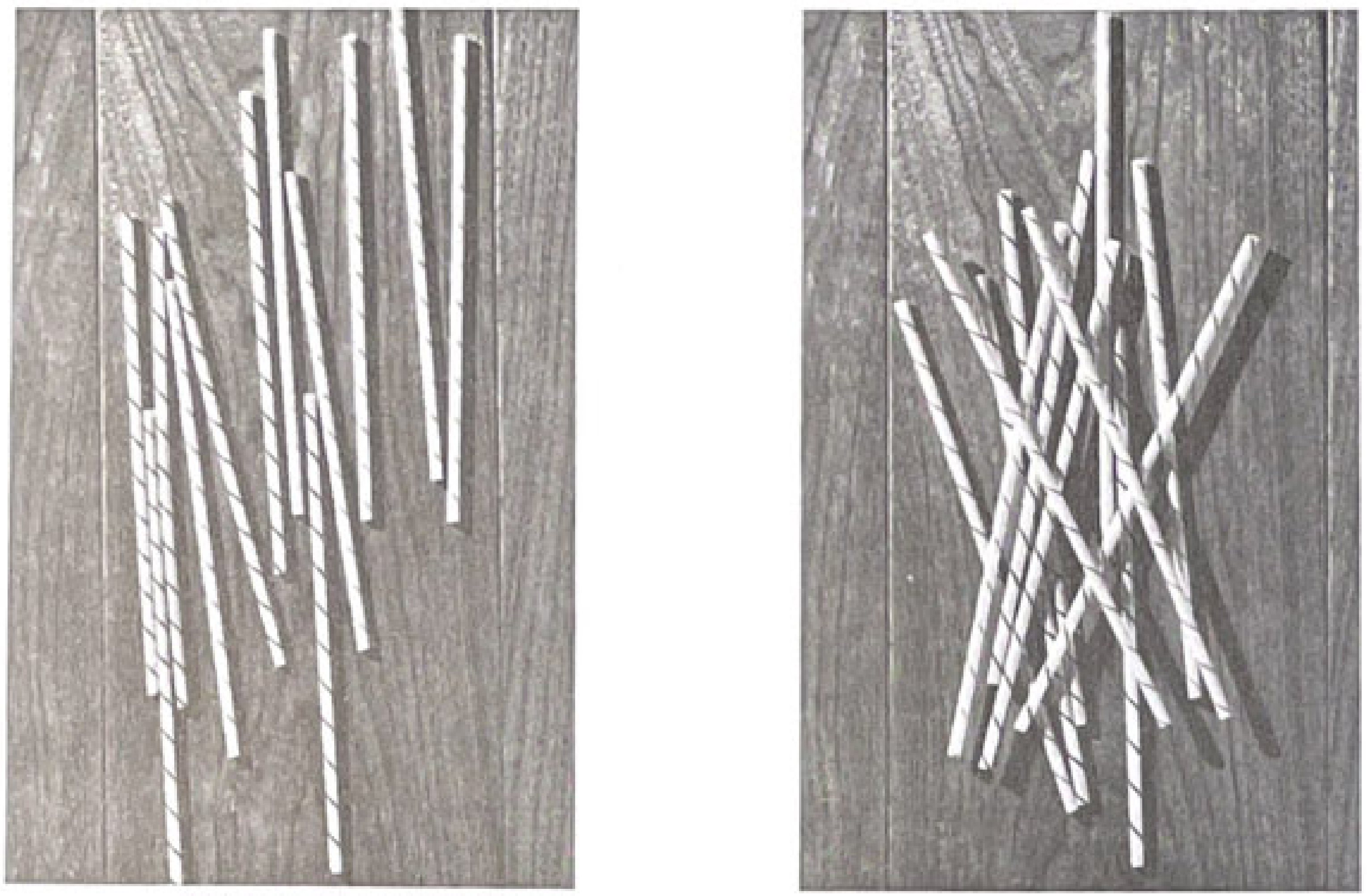
These rules are just "tricks of the trade" and should come easily to you because you've made quite a bit of progress in your course already. At first, some of these rules may seem more complicated than others, but don't be discouraged. If you practice using them in your drawing, you'll find that before long they've become second nature to you. Not only that, you'll also discover that they're much simpler than they might have seemed at first!

Being able to use perspective is especially important to the professional artist. It's not just an added "extra," it's a necessity for most realistic commercial and fine art. Learning to use perspective is an important step toward your goal of drawing pictures of professional quality. It's something that's worth learning, because, like a wise investment, it will pay off in the future.

Artwork by Tore Asplund.

Overlap

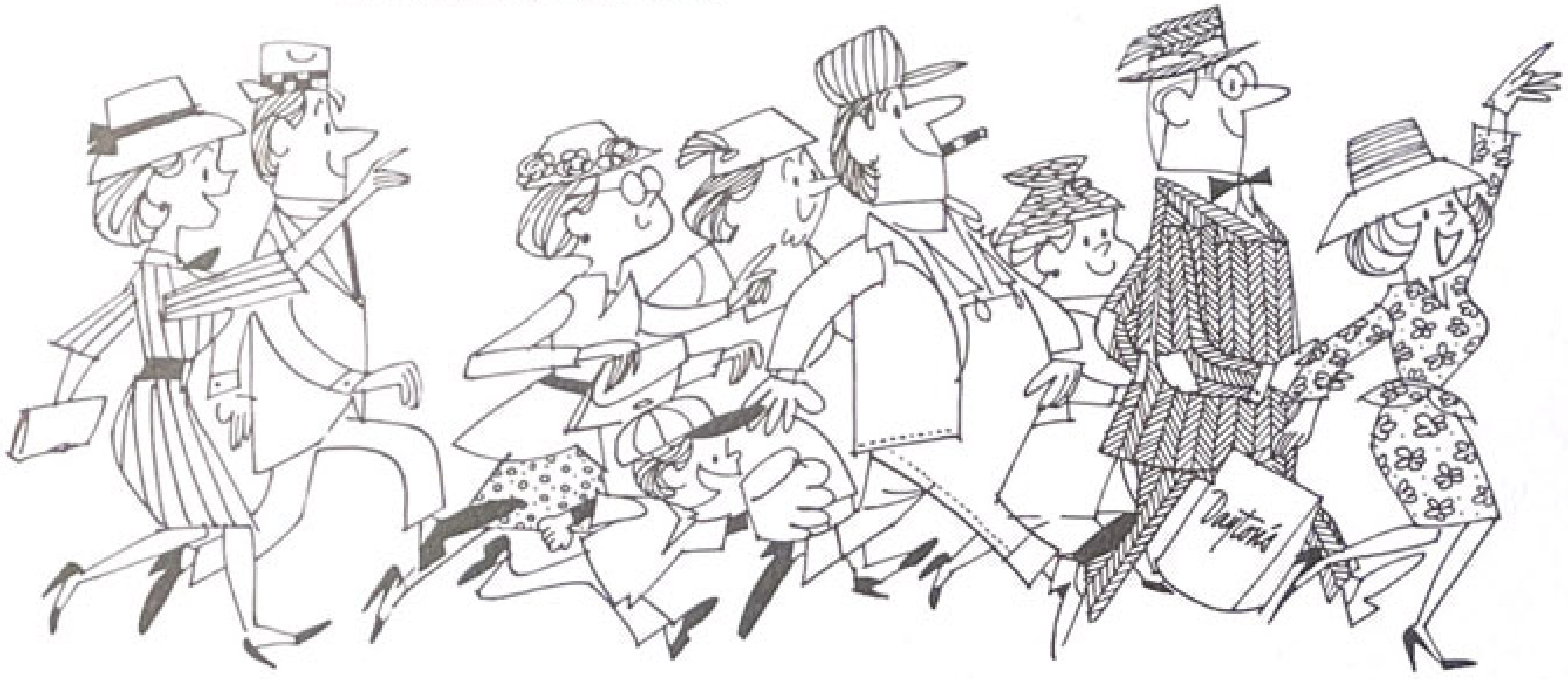
Overlap is the simplest device of perspective. In fact, you've probably used it already in your own artwork, though you might not have known its name. Overlap occurs when one object is in front of another object and hides (overlaps) part of that other object. If you draw one object that overlaps another, the object that is partially hidden appears to be farther away than the object that hides it.



Photographs by Bob Blanch.

Study the two photographs of the straws. In the first photograph there is no overlap. All of the straws are the same distance from the viewer. In the second photograph some of the straws overlap other straws. Notice how much more depth there is in the second photograph. We know that some of the straws are closer because they overlap and hide some of the other straws.

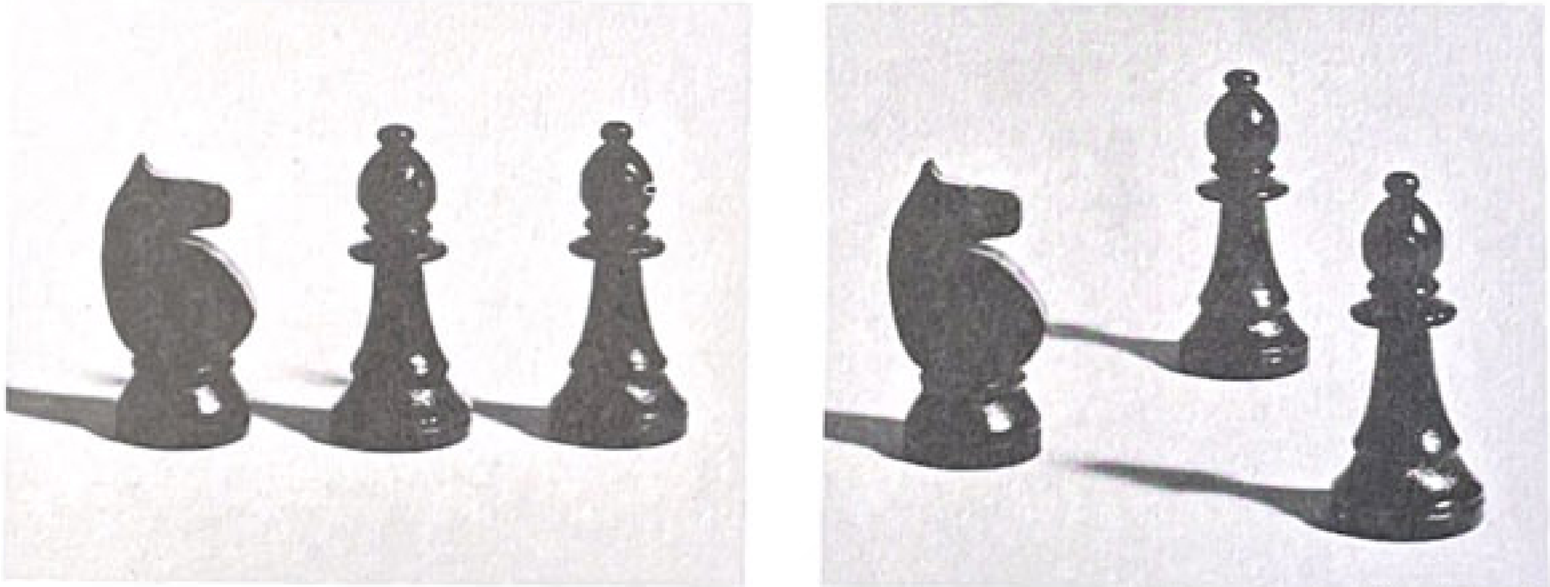
In this cartoon the artist has skillfully used the overlap principle to give his artwork depth. Even though all of the figures are flat and linear, some of them seem closer than others. Notice how the figures that hide parts of the other figures appear closer than the figures that are partially hidden.



Artwork by Ray Tollefson.

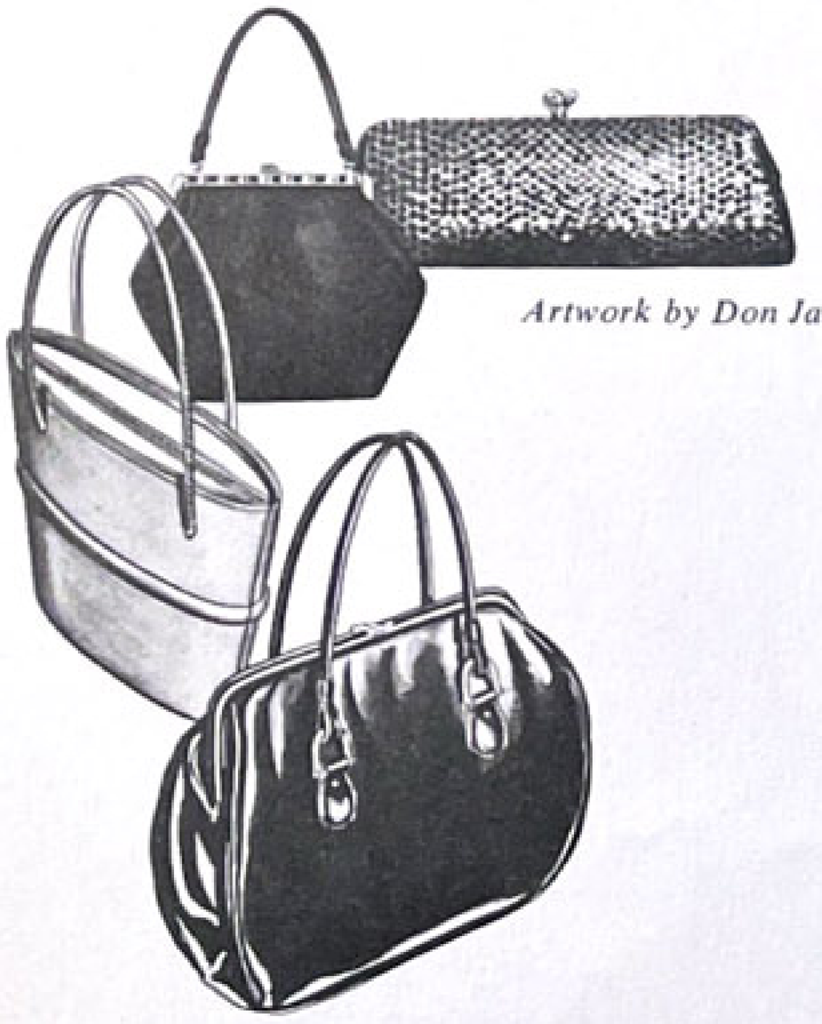
Position

Position is another device of perspective that you've probably used already without even thinking about it — when you wanted some things in your picture to appear farther away than others, you simply *positioned* or placed them higher up on your drawing paper. You did this because that's the way things actually appear to the eye when they're farther away; they're higher up in your field of vision.



Photographs by Bob Blanch.

The two photographs of the chessmen are a simple demonstration of the principle of position. In the first photograph, the chessmen are lined up on a flat surface the same distance away from the viewer's eye. In the second photograph, you can tell that the piece on the right is the closest, the piece in the middle is the farthest away, and the piece on the left is just about half-way between the two. You can tell this because of their positions — the farther away the piece is, the higher it appears in the picture.

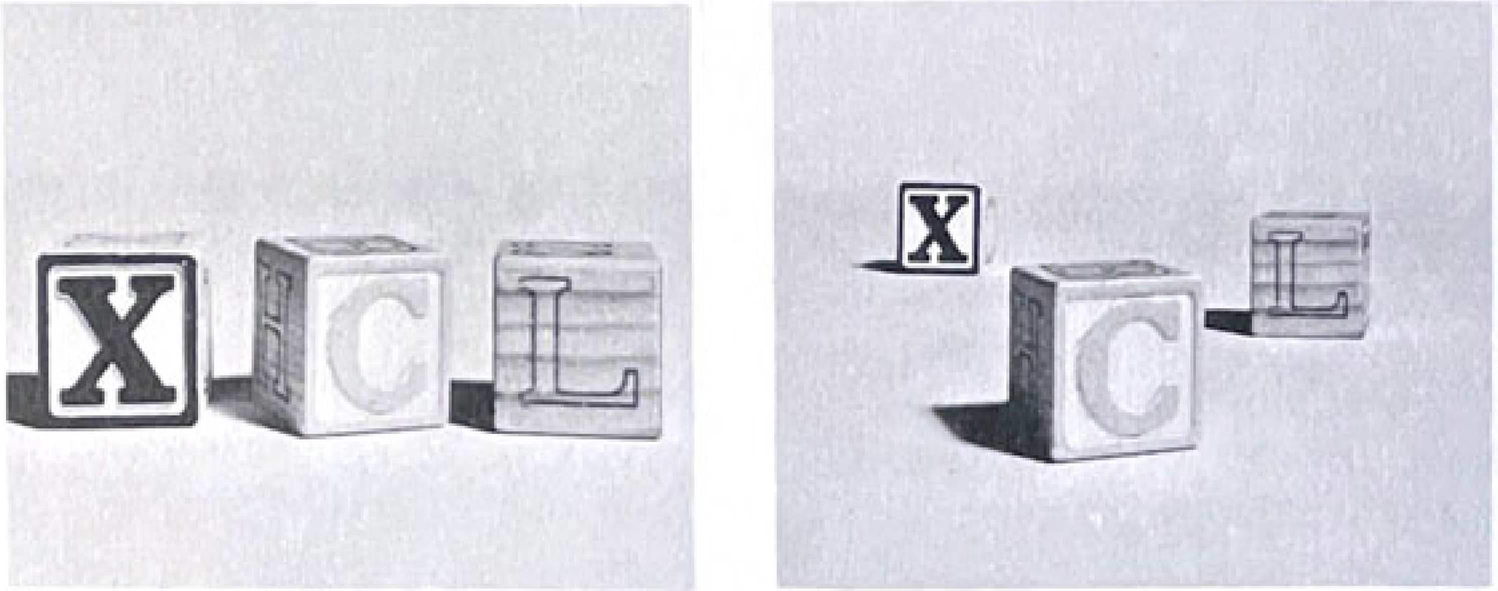


Artwork by Don Jardine.

Even though there is nothing but white space around these skillfully rendered purses, the artist has created a feeling of depth and space by the use of overlap and position. And it is especially the positioning of these purses that gives the illusion of depth, for the overlap is slight. If these purses were all lined up side by side with no overlap, the picture would lose much of its effectiveness. You can see that perspective is important for giving advertisements that all-important eye-catching quality.

Size

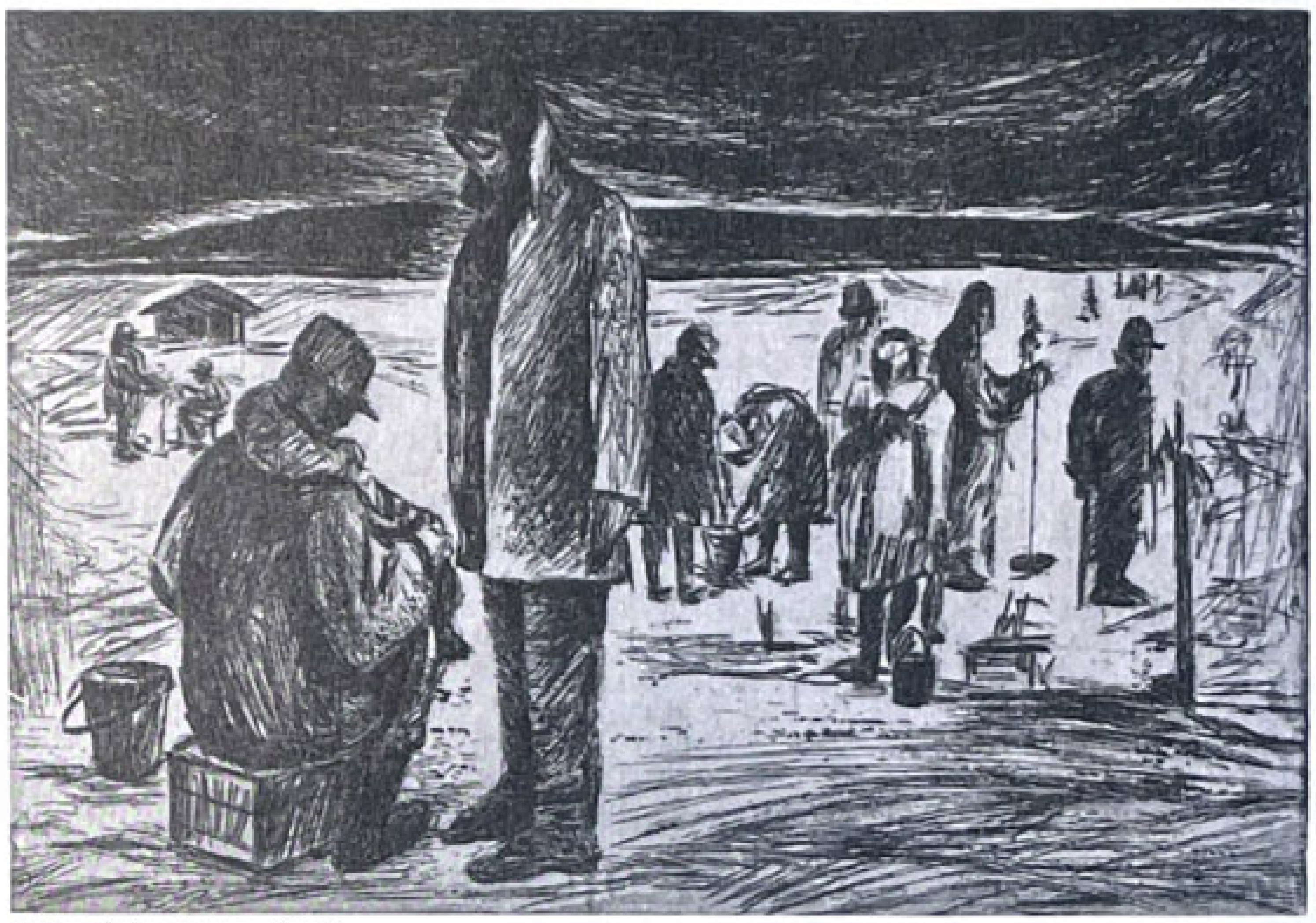
You already know that objects appear to get smaller as they go into the distance. This principle will be extremely helpful when you want to indicate depth. Just by drawing two similar objects – one large and one small – you will be able to give the illusion of depth. The large object would seem to be close to the viewer and the smaller object would seem to be far away.



Photographs by Bob Blanch

In the two photos of the blocks, you can see a dramatic example of how size can give the illusion of depth. All of the blocks in the first photo are the same distance from the viewer. These blocks appear the same size. In the second photo the "X" block and the "L" block are farther away than the "C" block. Both the "X" and "L" blocks appear smaller than the "C" block, but the "X" block is farthest away and it appears smallest. Also notice the "position" of the blocks. The farther blocks are "higher" than the close block.

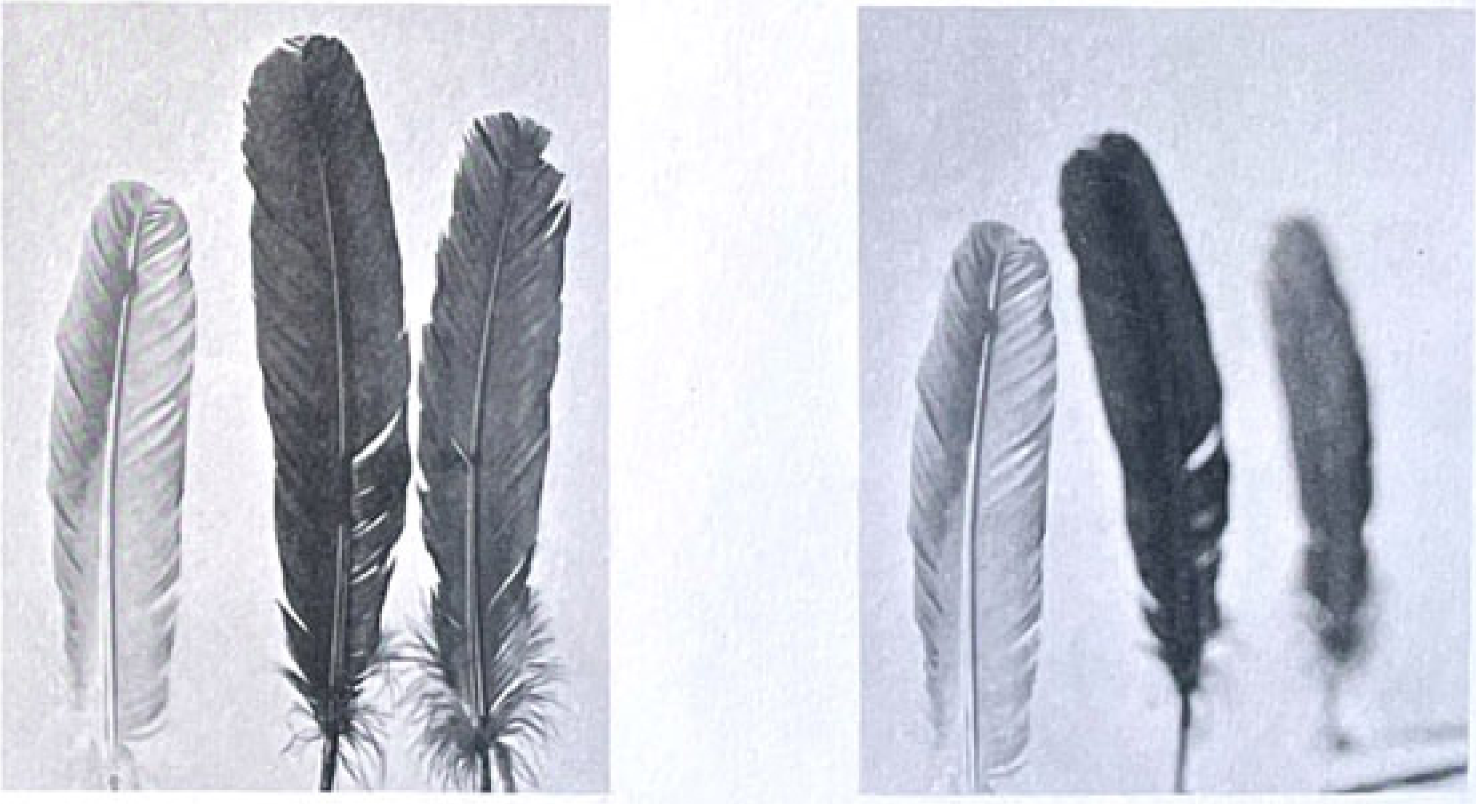
This etching is a good example of size relations and how they can indicate depth. Because the two large figures are so much bigger than the rest of the figures, they seem to be in the foreground – they appear to be close to the viewer. The small figures seem to be in the background – they seem to be far from the viewer. Also notice that the farther back a figure is, the higher it is in the picture.



Artwork by Austra Ogulis

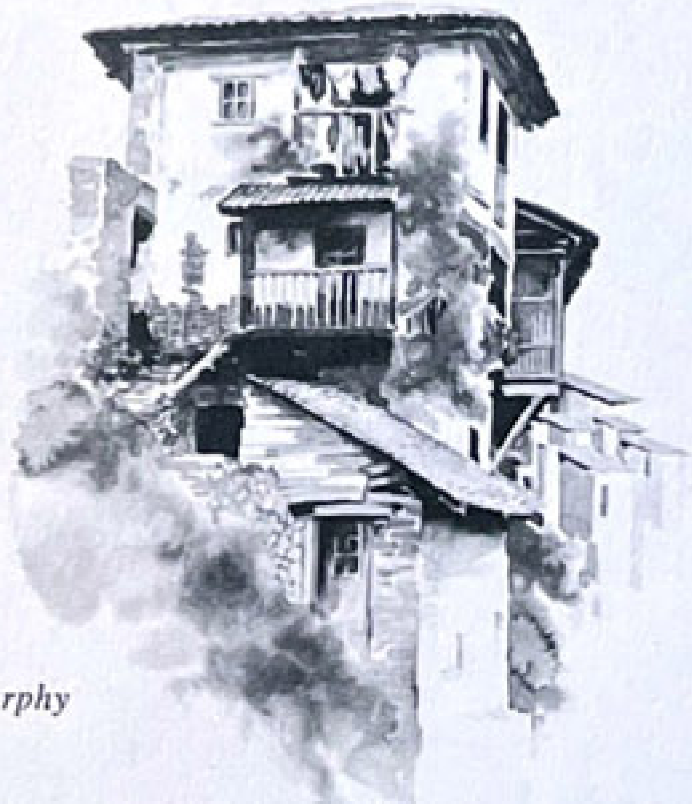
Detail

As an object gets farther and farther away from you, it seems to become indistinct and "fuzzy" – that is, it loses detail. When you draw distant objects with very few details, it helps create the illusion of depth in your art.



The photographs of the feathers are good examples of loss of detail. First examine the photo that shows all three feathers with equal amounts of detail. All of the feathers in this photo are the same distance from the viewer. In the other photograph, only one feather has clear, sharp details. This is because the other two feathers are farther away. Remember, loss of detail occurs when an object is viewed from a distance.

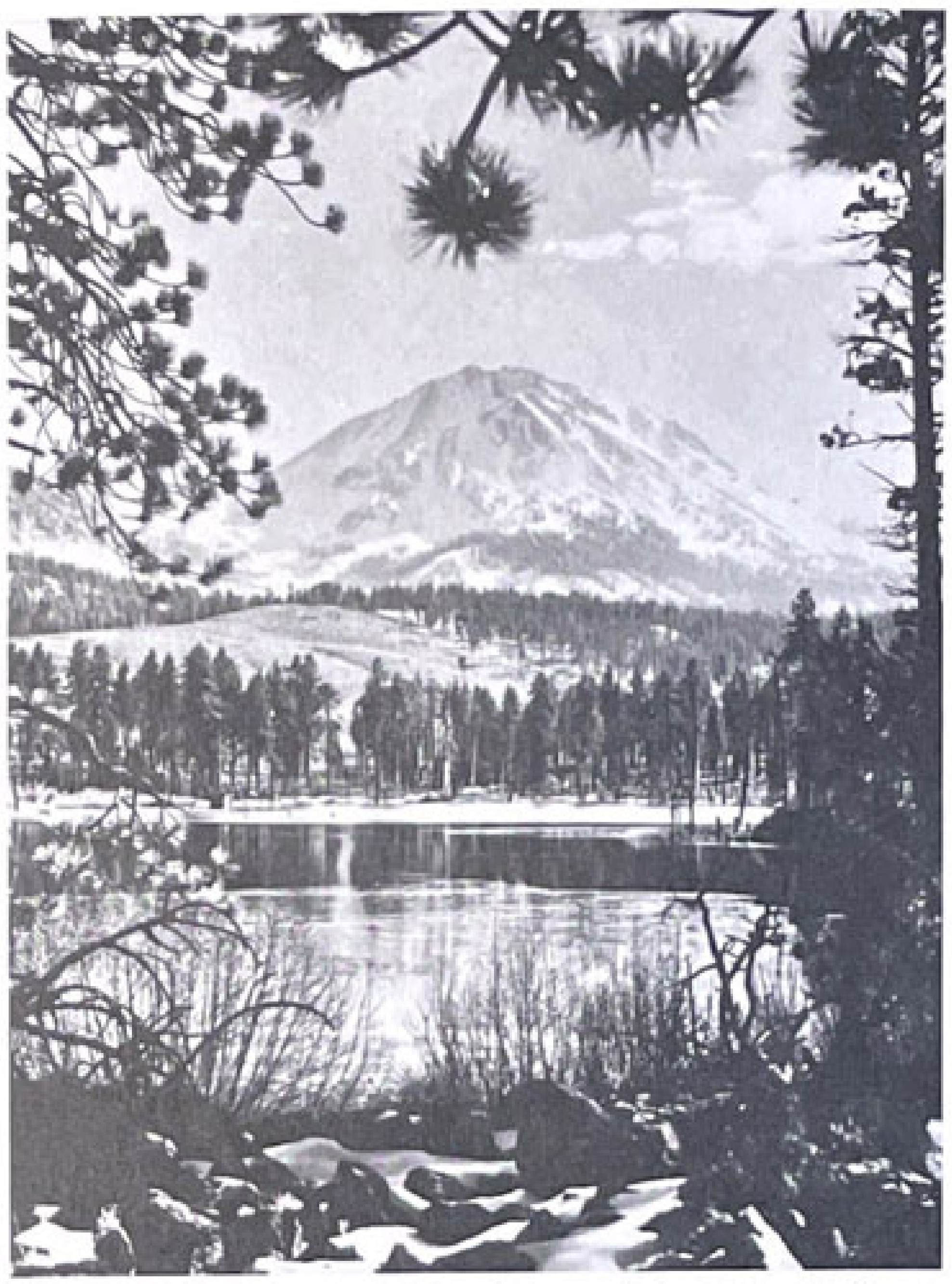
The artist has used loss of detail to help create perspective in the transparent wash drawing of the buildings. The buildings on the right side of the drawing seem to be far away. This is because the artist not only made them smaller than the main building in the center of the drawing, but he also drew them with less detail.



Artwork by Charles Murphy

Value

Objects viewed from a distance appear to change in value. This is a trick the atmosphere plays on our eyes. Actually, the moisture particles in the air act like layers of gauze. One layer of gauze is almost transparent, but many layers change the value of any object you see through them. Follow this rule about value changes: *the value of an object as it recedes into the background tends to become the same value as that background.* In other words, a white object would appear to get darker as it went into a dark background (night) and a black object would appear to get lighter as it went into a light background (day).

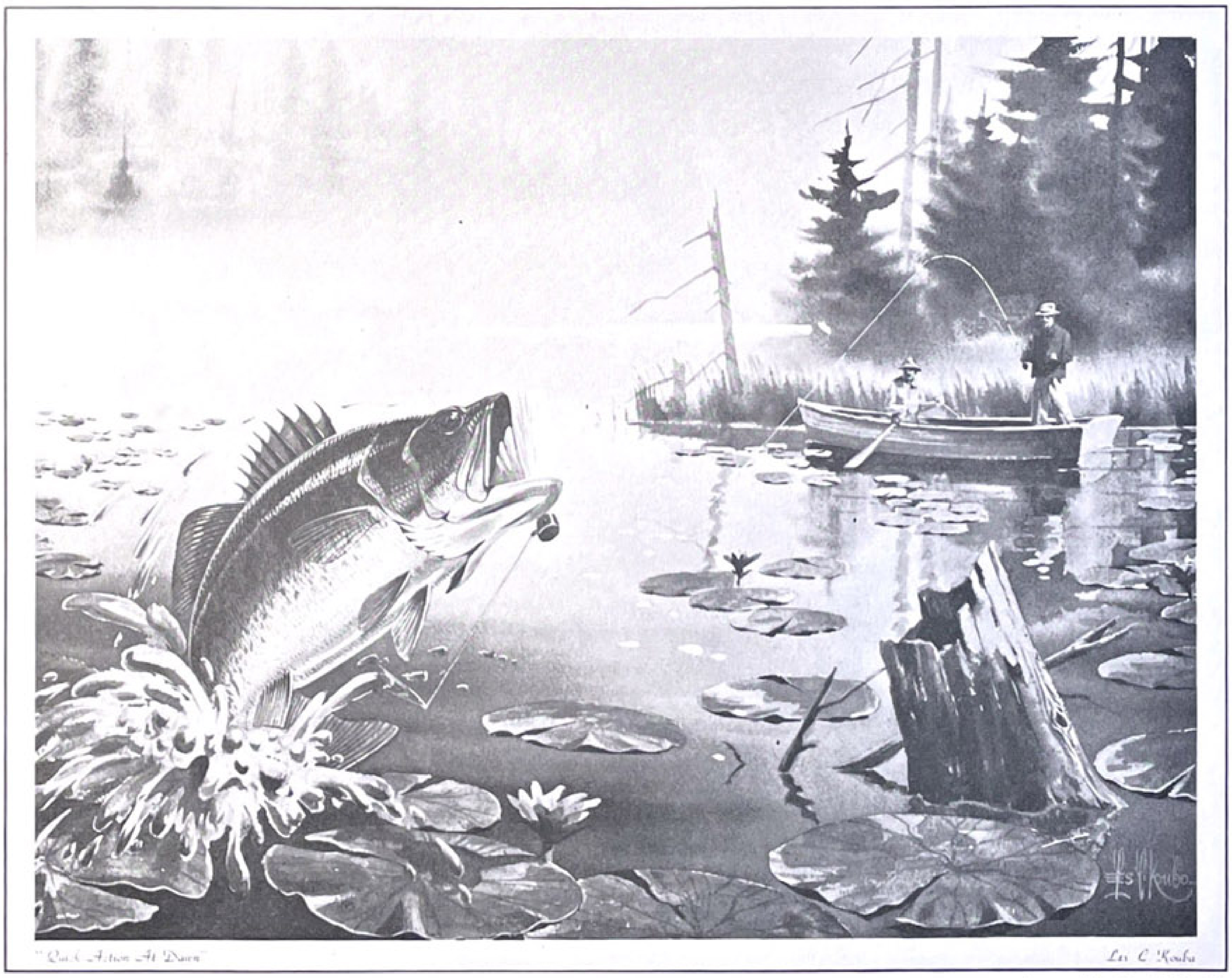


Photograph by Ewing Galloway

Study the value changes that take place in the photo of the mountain. Compare the value of the rocks and trees in the foreground to the value of the rocks and trees in the background. The objects on the mountain are lighter because the atmosphere of a bright day lightens values. If this picture were in color you could see that the "value change rule" also applies to color. The trees in the background would be a much lighter, grayer green than those in the foreground.

This piece of art is a good example of loss of detail as well as of value change. The trees in the distance seem to be far away because the artist used a lighter value for them and because he gave them less detailing. Remember, as objects go into the background they seem to become the same value as the background.

Because the sky in this picture is light and hazy, the trees in the background are light and hazy.



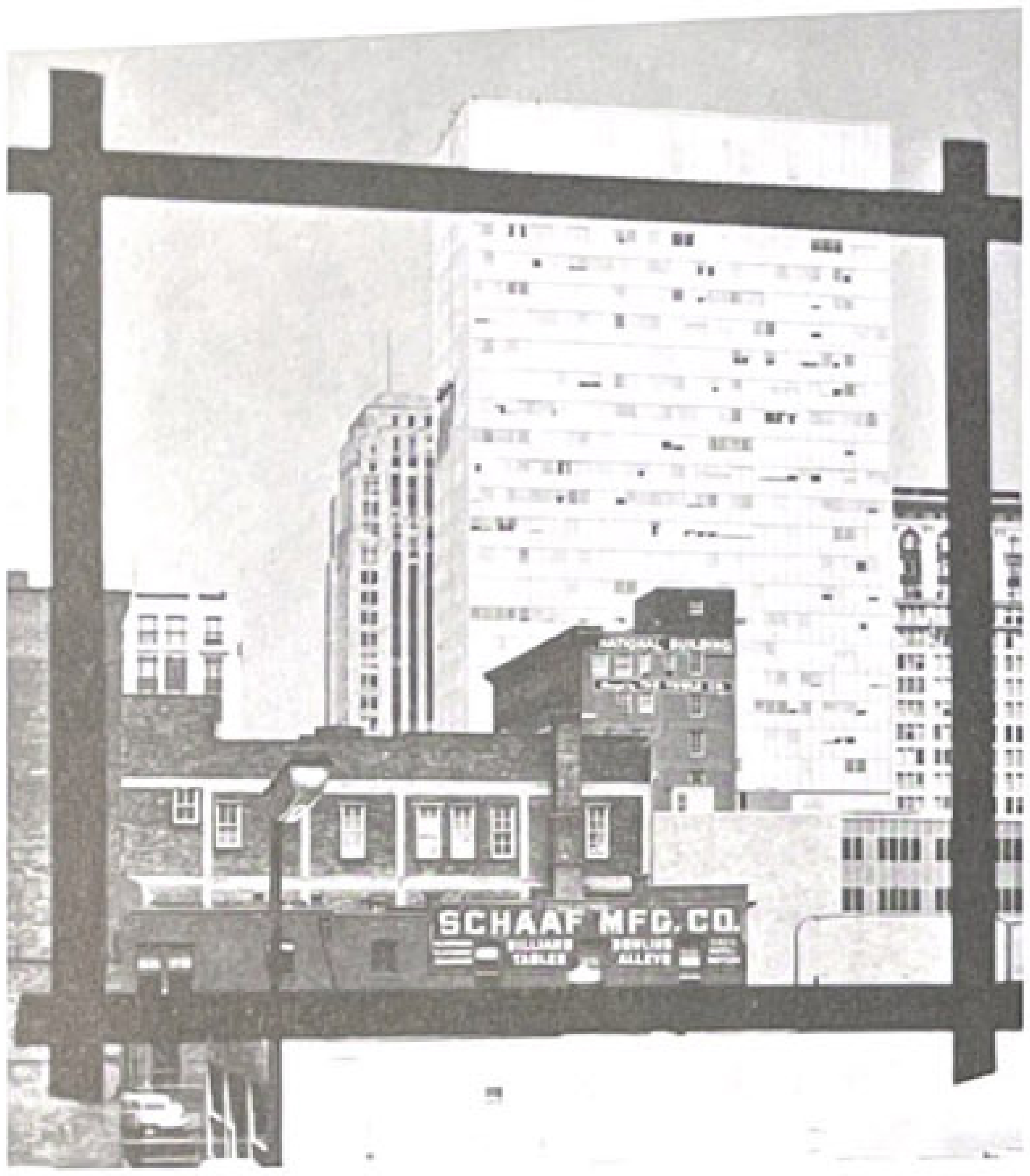
Artwork by Les C. Kouba

The Picture Plane

Earlier, in the "Form" section, you learned how to draw objects so that they give the impression of solidity. This illusion of solidity is part of perspective. Flat surfaces are usually referred to as planes. The flat surface you draw on is called the picture plane because it's the flat area (the plane) on your drawing paper that your picture çovers. In order to get depth, you draw objects so they look as if they go "behind" the picture plane . . . into the paper. Most artists take the picture plane for granted, as you probably do. You realize the paper is flat. Now you will learn how to capture the illusion of depth and space on this flat surface. By the skillful use of the rules of perspective, you can make an object look one foot away or a hundred feet away.

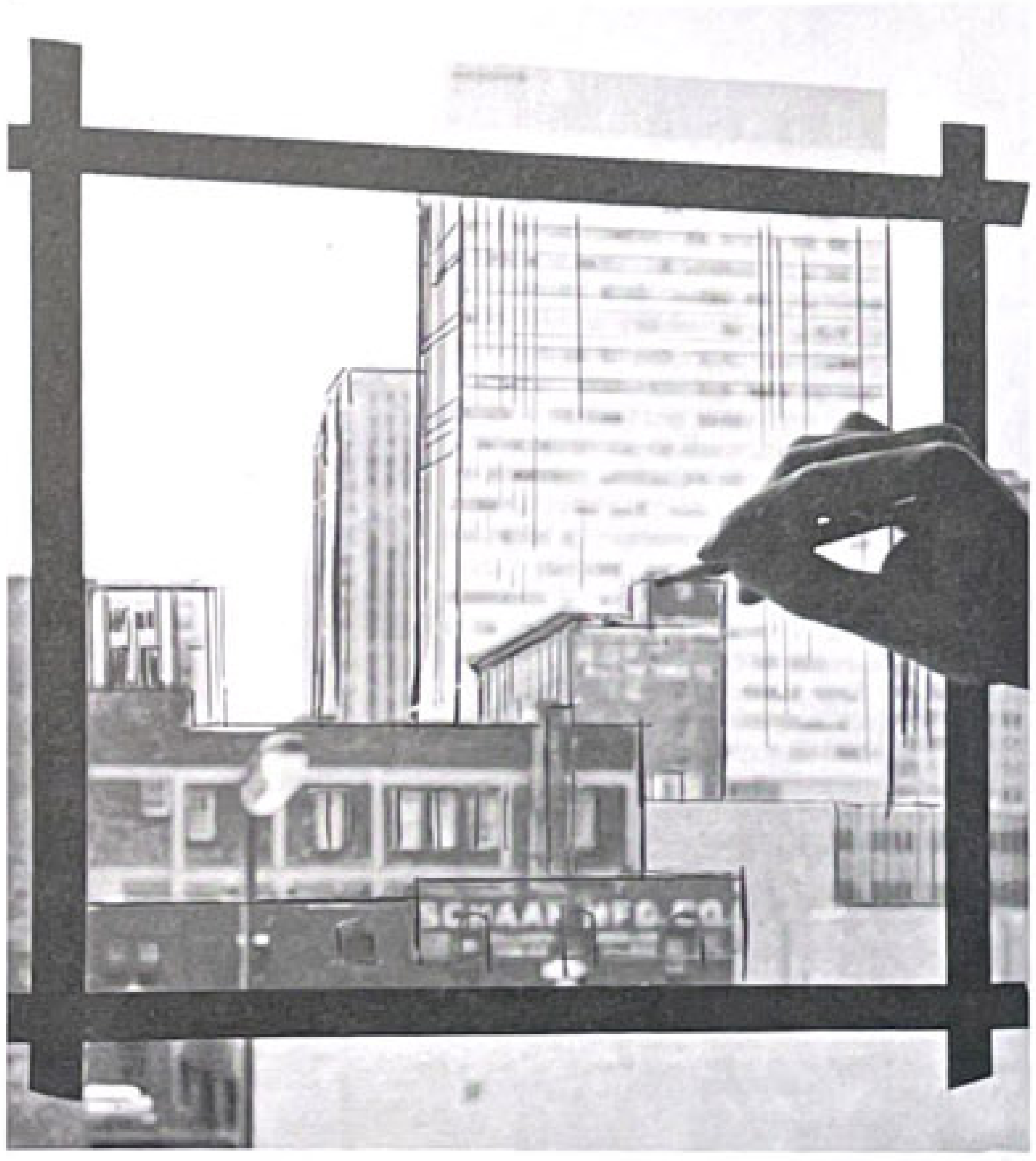
So far we've been talking about the "real" picture plane . . . the paper on which you draw. But you might think of another picture plane – straight up and down in front of you – like an invisible wall! Think of it as a rectangular piece of glass that you hold up in front of you to look through. It may also be thought of as an empty picture frame through which you observe reality. Study the photographs on this page. As an illustration of this principle, we put masking tape on a window and had an artist trace the scene he saw. It's nothing more than tracing – but it's meant to prove this point: Once you have the imaginary sheet of glass or empty picture frame fixed in your mind – it becomes only a matter of transferring what you see there onto your paper.

As an artist, you don't have to be a slave to the scene you see; you can interpret the scene in order to make a better picture. The scene before you will obviously always be realistic since it's what you see. But the finished drawing may be different because you can interpret what you see.

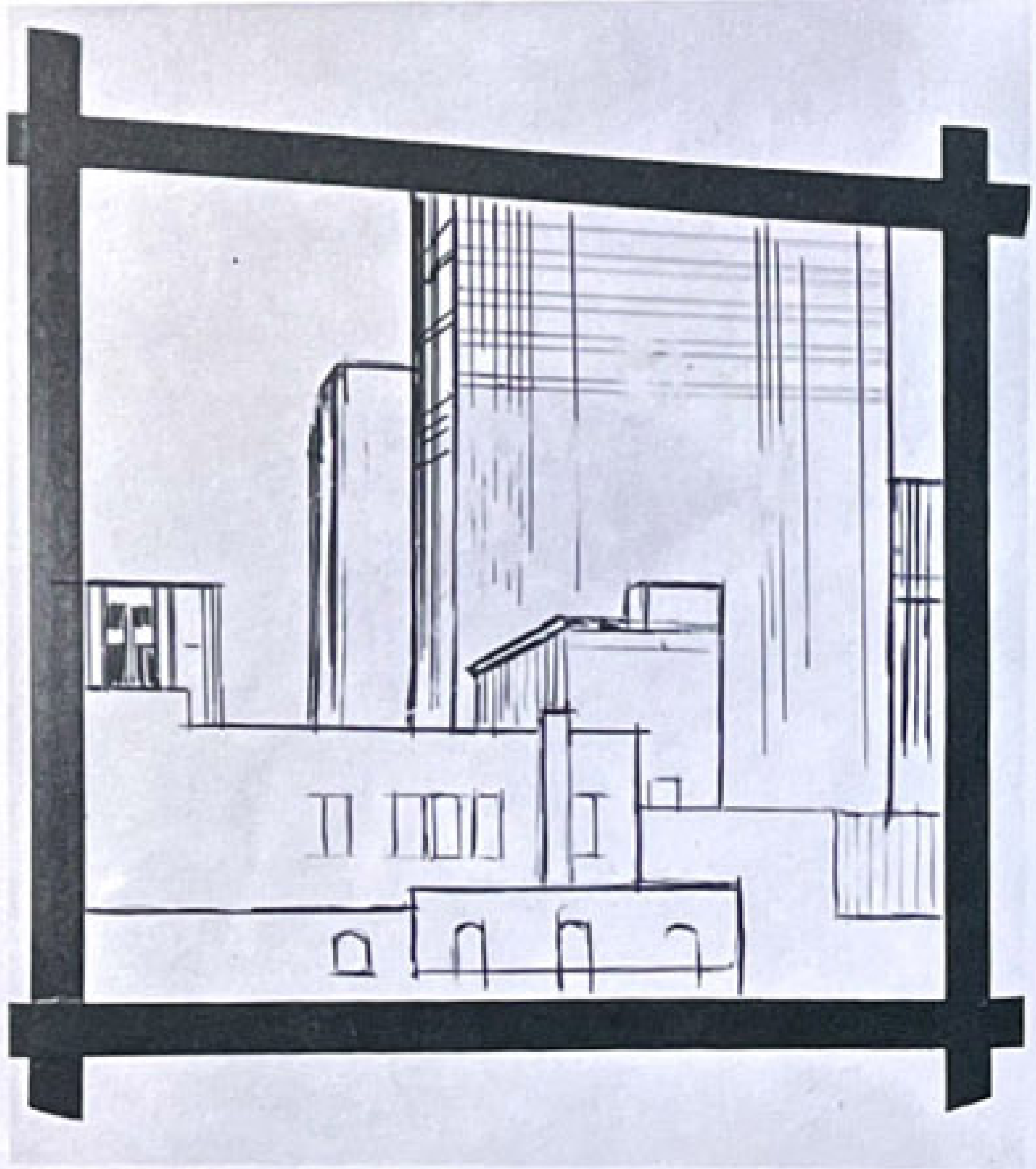


The glass of this window can be compared to a piece of drawing paper. In fact, the artist taped a sheet of clear acetate (plastic) to the window so he could draw on it. In this case, the clear acetate was plane and the picture plane.

In this photograph you can see how the artist traced the street scene on the acetate. In order to do this he had to be careful not to move from his original "station point" (location of the artist).



After he finished tracing the street scene the artist took the acetate off the window and taped it to a piece of drawing paper. Notice how he was able to create a feeling of depth. You won't be tracing your pictures, but the understanding of what a picture plane is makes the simple rules of linear perspective easier to understand.



Photographs by Bob Blanch

Tools

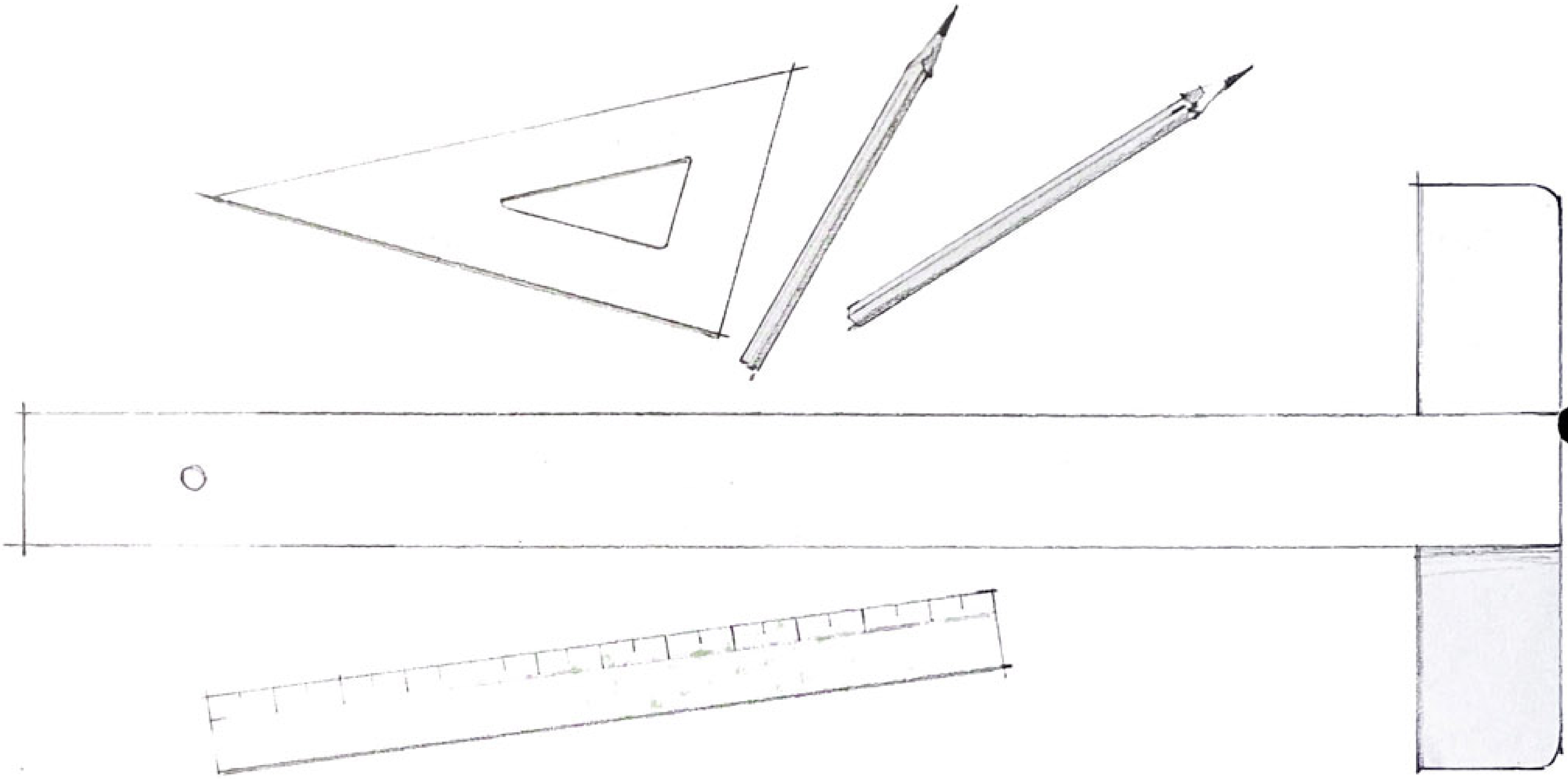
Many of the objects you will be drawing in this section will be geometrically shaped – they will have straight sides and square corners. In order to draw these objects accurately, you will need to use some tools. The tools will not be new – you've used them before – but let's look at them again before we start perspective drawing.

Let's review the many uses of your old friend, the T-square. In addition to mounting paper on your drawing board, you will be drawing horizontal lines with the T-square. When you use the T-square, remember: always butt the "cross piece" against the same side of your drawing board. This is important because boards are seldom perfectly square and if you use more than one edge, your work might be "out of square."

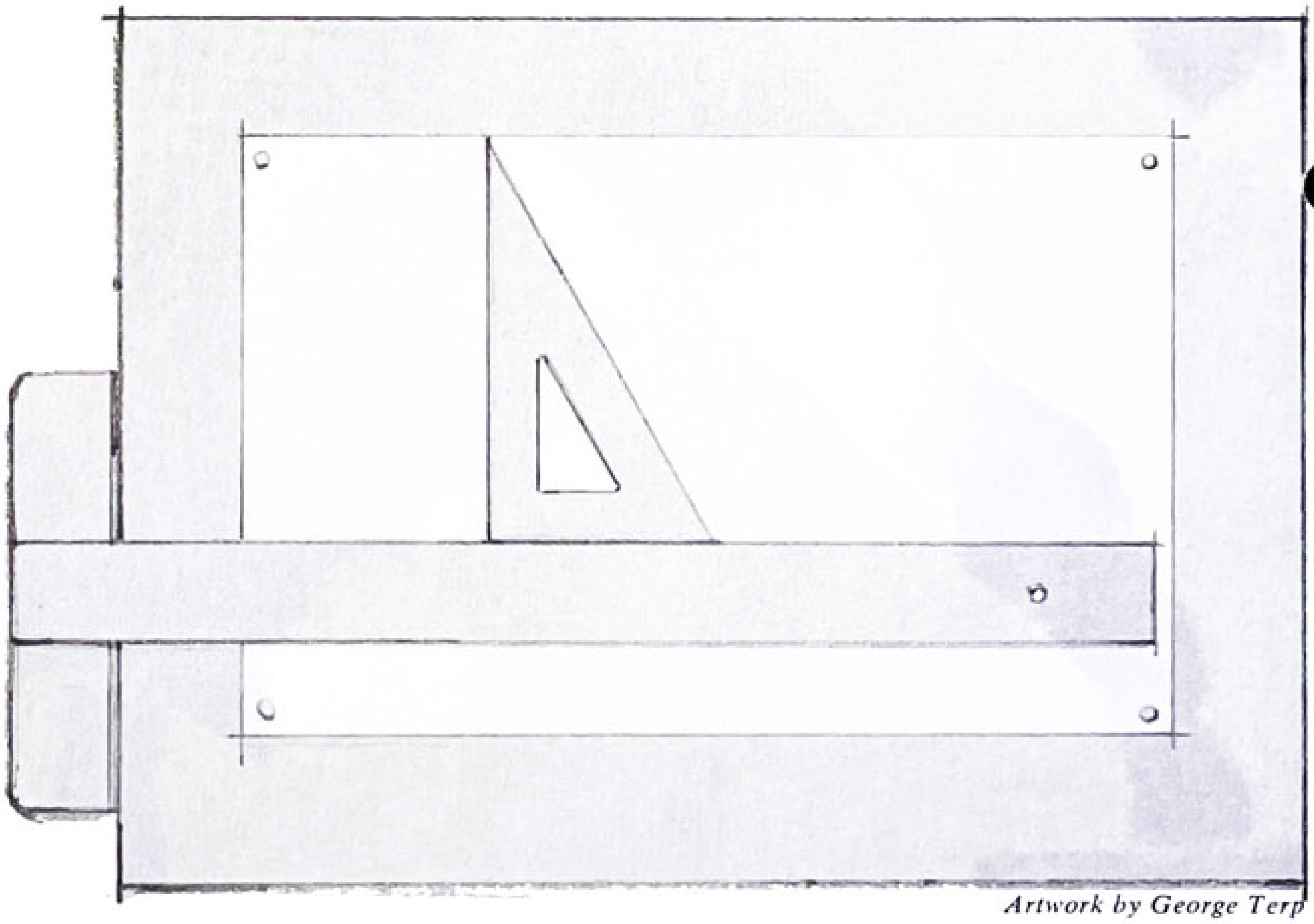
By using your triangle and your T-square you will be able to make accurate vertical lines. Simply brace the T-square against the side of the drawing board (as though you were going to draw a horizontal line) and then brace your triangle against the long "blade" of the T-square.

Your ruler will come in handy for all diagonal lines and also for darkening and straightening short vertical or horizontal lines.

Study the illustrations that show these tools in use.



You will be able to draw accurate horizontal lines by holding the "cross-bar" of the T-square against the left side of your drawing board. Use the long "straight edge" to guide your pencil. By holding a triangle against the T-square (as is illustrated in the drawing), you can draw accurate vertical lines. Try drawing some vertical and horizontal lines on your own drawing board.

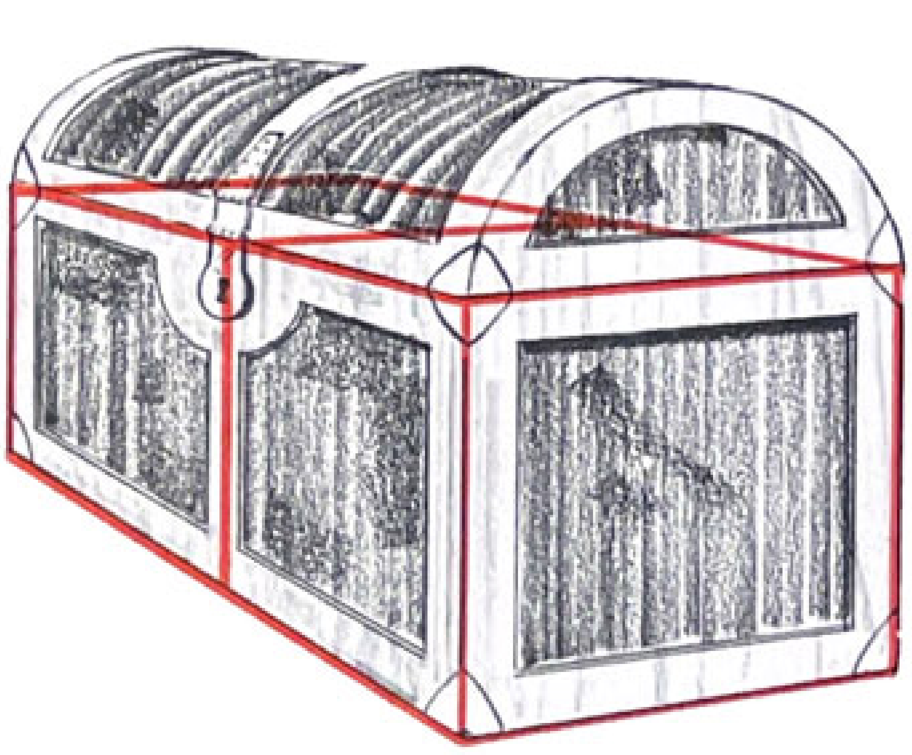


Artwork by George Terp

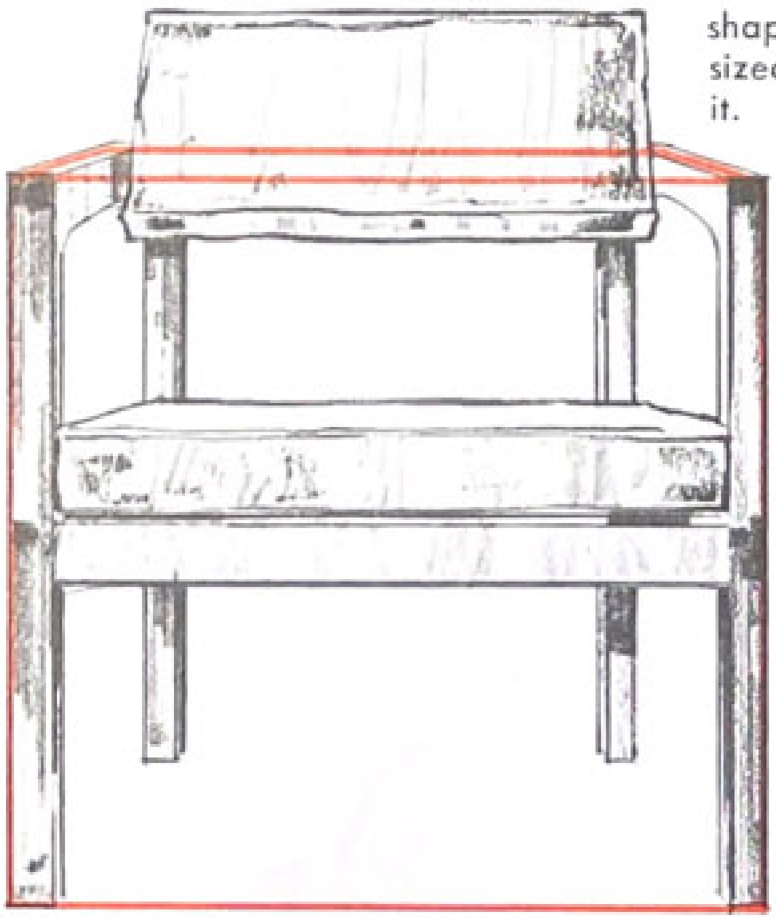
Drawing the Cube

Now that you've learned the basic facts of perspective, you're about to start your study of *linear* perspective. You'll find that drawing the cube from various angles is going to be one of your greatest helps in learning the tricks of linear perspective. Because the cube is a simple geometric form, it will be an easy one for you to master.

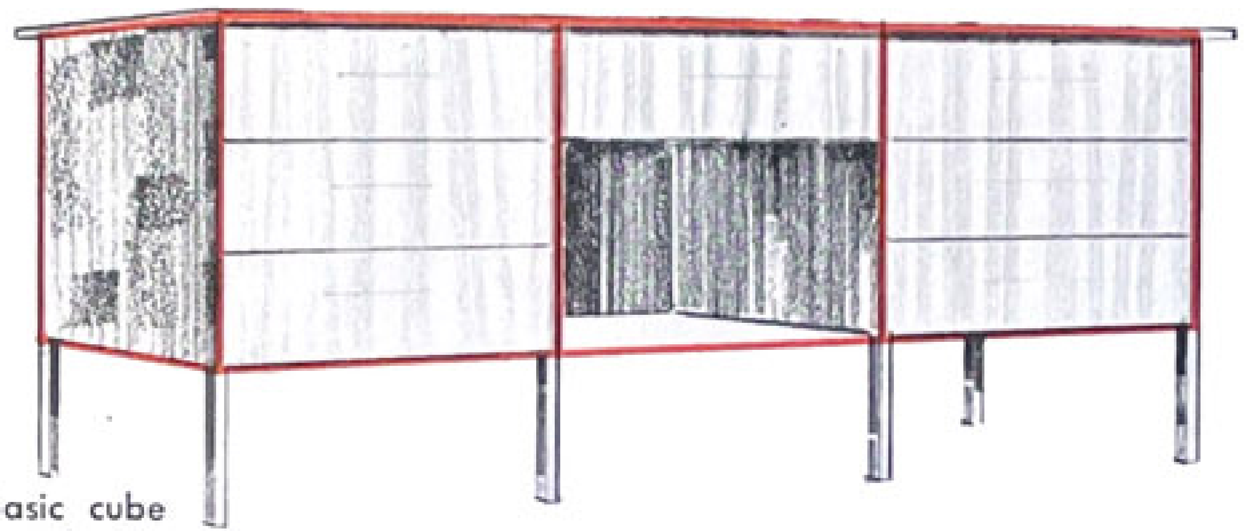
Once you can draw the cube, you'll find it much easier to draw common objects that aren't perfect cubes, but are constructed like cubes. A chair, a desk or a trunk are objects that we seldom think of as cubes, but they are basically cube forms. Many objects are rectangular which could be thought of as a stretched out cube. And you will find that the rules of linear perspective for drawing objects like the desk and trunk are the same as the rules for drawing the cube.



This trunk is composed of two cube shapes. Remember, if you can draw the cube, and can see it in various objects, it will make drawing much easier for you.



This chair is composed of one basic "cube shape." Notice that the artist has emphasized the cube so you can quickly identify it.

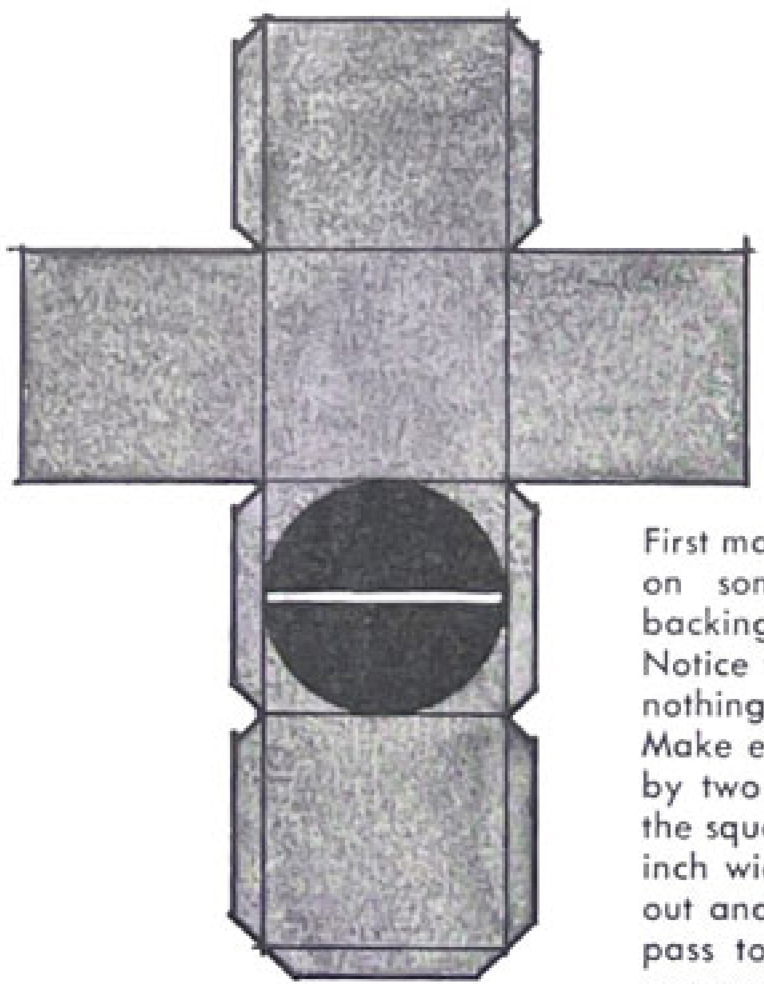


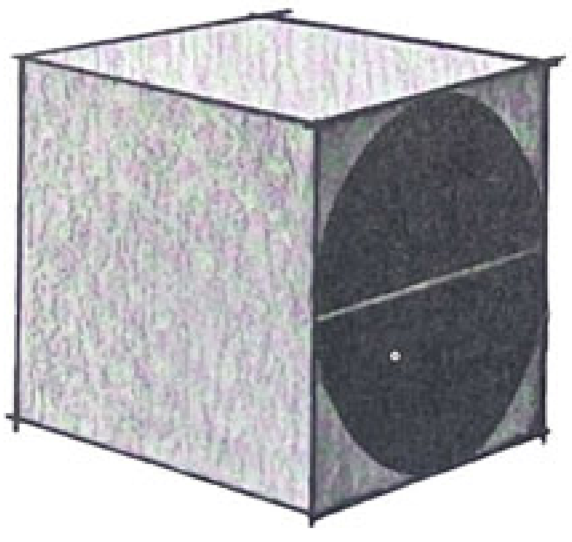
This desk is made of three basic cube shapes. There is one cube on each side of the desk (the drawered parts) and one cube in the center.

Artwork by Jim Deneen

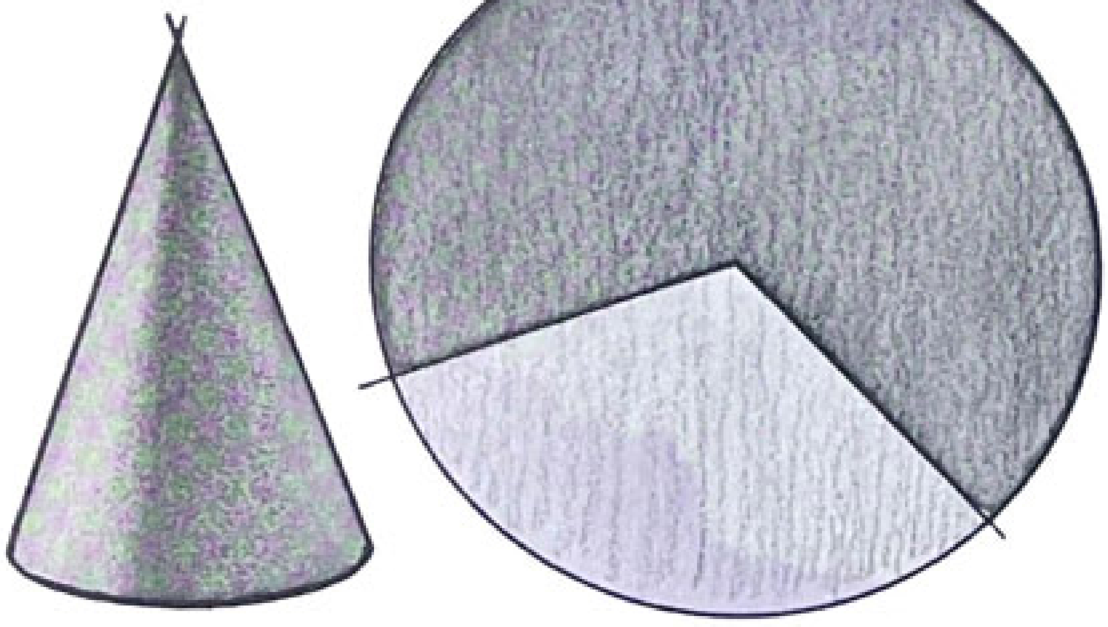
Constructing the Basic Forms

Along with the cube, the cone and the cylinder will be important aids in learning linear perspective. And in order to become really familiar with these basic forms — how they appear from different angles — you should make a set of your own forms to study and draw. It's easy . . . all you need is a pair of scissors, some tape, a scrap of lightweight cardboard and a razor blade.





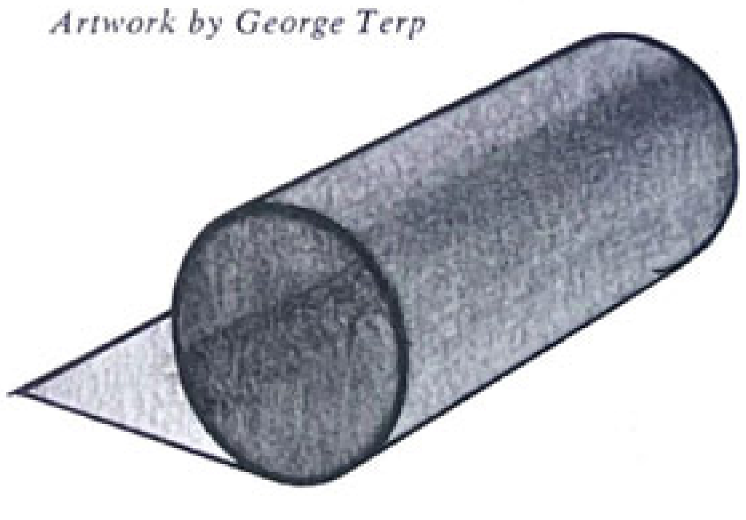
First make the cube. Drawing a pattern on some lightweight cardboard (a backing from a sketch pad will do). Notice that the pattern for the cube is nothing more than a series of squares. Make each of your squares two inches by two inches. After you've ruled out the squares, add the flaps (one quarter inch wide). Before you cut the pattern out and put it together, use your compass to draw a circle in one of the squares. The circle will come in handy when you study articles in perspective. Fill in the circle with ink and then divide it in half with a white pencil or with a stroke of opaque paint. After you cut out the pattern, use a razor to scratch the lines that indicate folds. Then, fold the pattern (scratches on the outside) and tape the cube together.

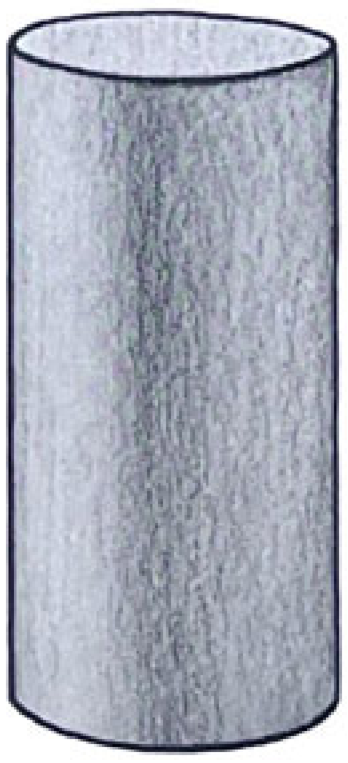


After you make the cube, go on to the cone. The cone is especially easy to make. Make a four inch circle on cardboard with your compass. Then, use your ruler and mark the lines that go from the center point to the outside edge of the circle.

Cut the circle out with your scissors. Then cut out the small piece and tape the cone together. Put the cone on a scrap of cardboard and carefully draw around the bottom of the cone. Cut out the circle and tape it on to the bottom of the cone.

Artwork by George Terp





The cylinder is a roll of lightweight cardboard that's taped together. After you tape it together, put one end on a piece of cardboard and draw around the bottom of the cylinder. Repeat this process to get a second circle. Cut out these two circles, and tape them to the ends of the cylinder.

Save these basic forms. As you continue studying, you will want to examine and draw these objects.

One Point Perspective

You know that objects appear smaller than they really are when they're seen from a distance. Just look around you. You'll see dozens of examples. And there's another perspective principle that's just as dramatic: objects or things that have parallel sides have perspective lines that converge or meet at a point in the background called a vanishing point. Or we could say that parallel lines, when drawn in perspective, actually converge (get closer together). In other words, lines that in reality are the same distance apart, appear to come together as they travel into the background. You've probably been aware of this for years. Most children, at one time or another, notice this principle when they walk down a railroad track. They can see that the distance between the tracks seems to get narrower, and yet as they walk toward the narrow part, it turns out to be the same width as the track they left behind.

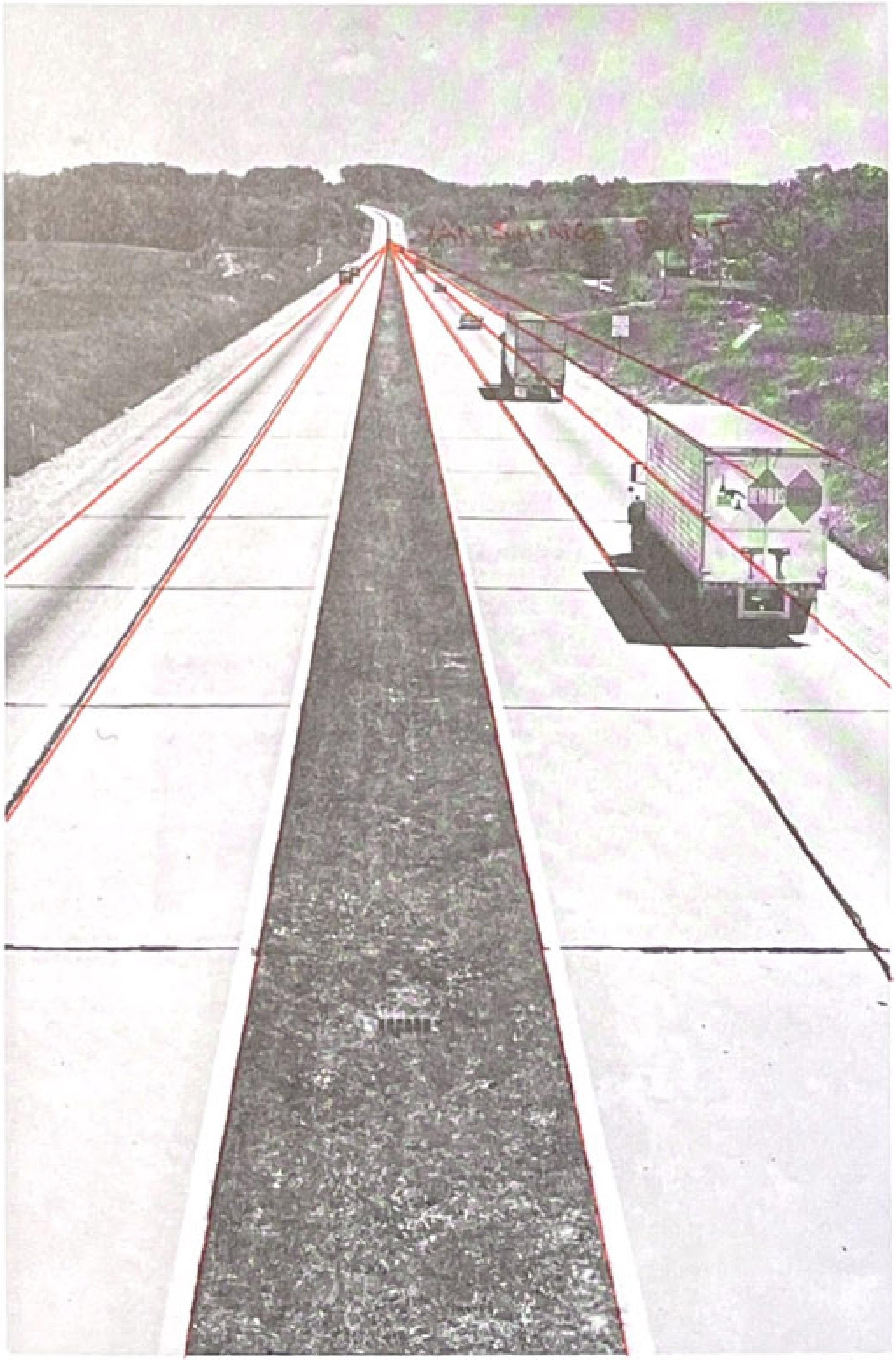
When only one vanishing point is involved in a drawing – the principle *of one point perspective* is then in use.

This principle is illustrated in the road photo on this page. Notice how the parallel sides of the highway appear to get closer together. While you know the distance between the side of the road is always the same, the road appears to be wider at the bottom of the photo (closest to viewer) than at the top of the photo (farthest from viewer).

The artist drew lines over the photo of the highway to point out the fact that parallel lines eventually meet.

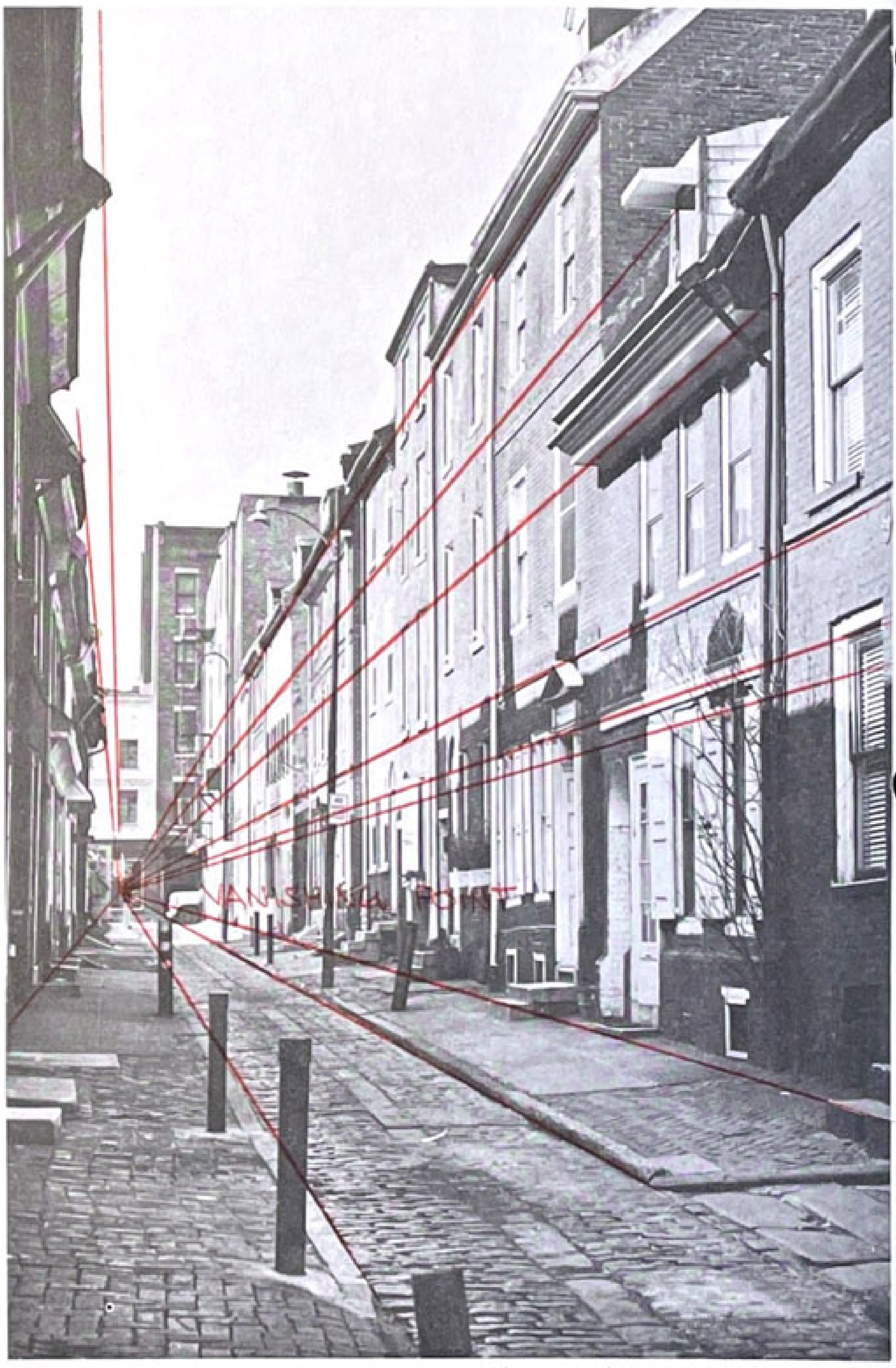
WHAT TO DO

Show yourself how easy it is to do a one point perspective drawing. Use the cube that you constructed for these exercises. Set the cube up in front of you, check the drawing in the text book to see how it must face you squarely, and make a quick sketch. Make four or five sketches each a different size. Then, refine your drawings by straightening the vertical and horizontal and perspective lines with your ruler, T square and triangle. Tape or tack your sketches so they don't slip while you are correcting them.



Photograph by Harold M. Lambert

There is the appearance of great depth in this photograph. The line of trucks and cars seems to extend far into the distance. The perspective in this photo comes from the dramatic contrast between the large objects in the foreground and the small objects in the background. Notice how the road seems to get narrower as it gets farther away. Remember, all things appear to get smaller as they go into the background. Notice that all of the parallel lines meet at one vanishing point. When this happens, the picture is in *one point perspective*.



Photograph by Harold M. Lambert

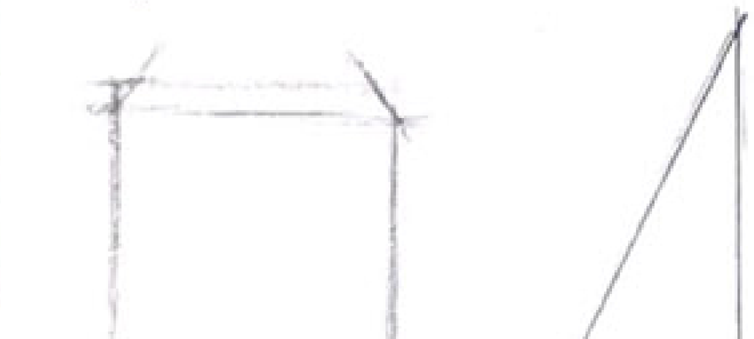
The tall buildings in this alley scene almost give the picture a "closed-in" look. You can tell that some of the buildings are closer than others because of the way the walls seem to get shorter as they get farther away. The street also seems to get narrower (just like the highway) as it gets farther away from you.

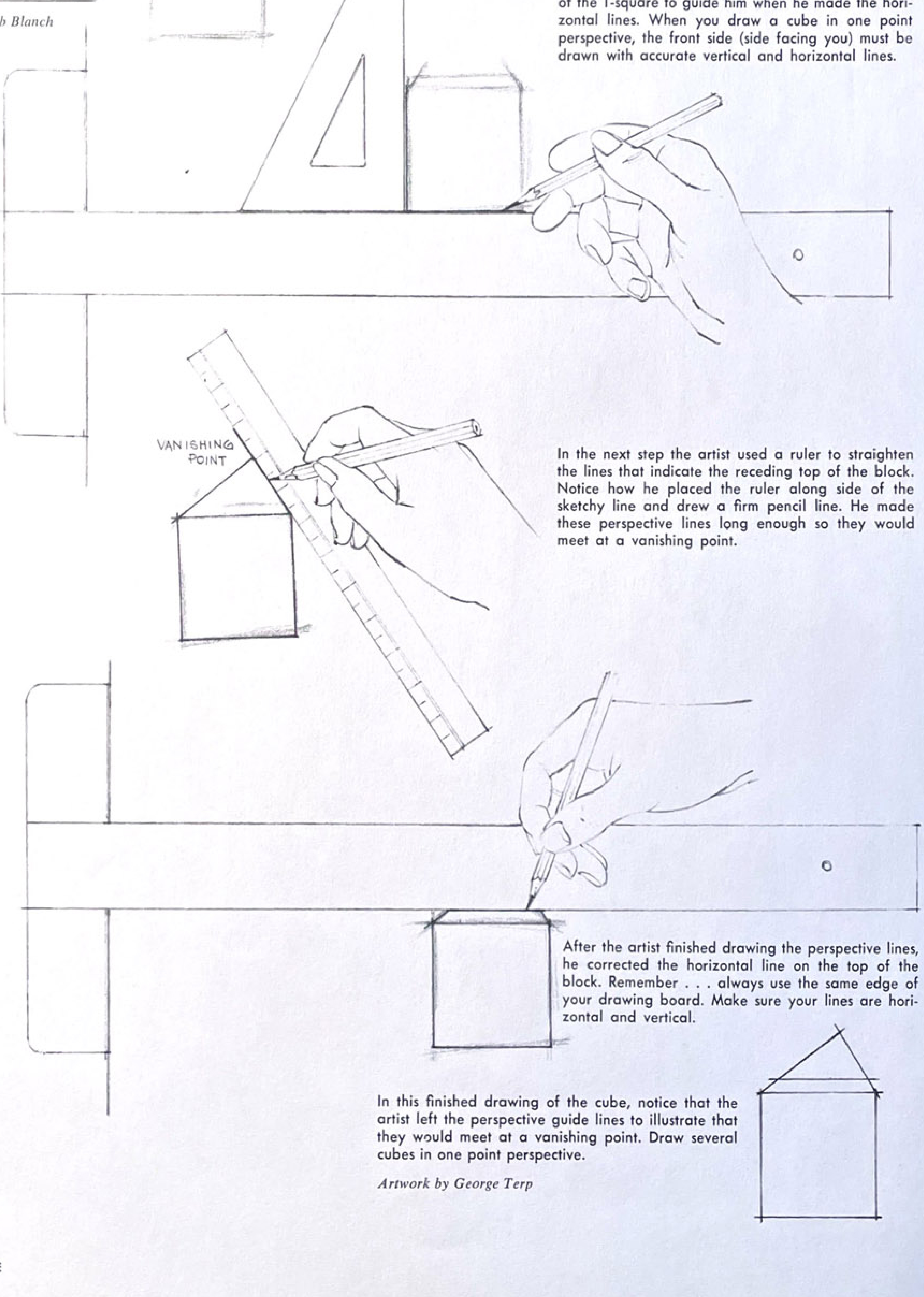
Notice that the lines the artist drew over the roofs and bases of the buildings get closer and closer together as they get farther away.

This photograph shows the cube that our artist used as a model for his step by step drawings. Study this view carefully. The outside parallel edges of the top side of the block in the photograph appear to get closer together as they get farther away.

Photograph by Bob Blanch

In order to draw this one point block the artist made a freehand sketch before he used any tools to keep the lines straight.





In the second step the artist straightened the vertical and horizontal lines of the block. Notice how the artist "butted" the T-square against the edge of his drawing board and corrected the vertical lines by using his triangle for a guide. He used the long side of the T-square to guide him when he made the horizontal lines. When you draw a cube in one point perspective, the front side (side facing you) must be drawn with accurate vertical and horizontal lines.

In the next step the artist used a ruler to straighten the lines that indicate the receding top of the block. Notice how he placed the ruler along side of the sketchy line and drew a firm pencil line. He made these perspective lines long enough so they would meet at a vanishing point.

After the artist finished drawing the perspective lines, he corrected the horizontal line on the top of the block. Remember . . . always use the same edge of your drawing board. Make sure your lines are horizontal and vertical.

In this finished drawing of the cube, notice that the artist left the perspective guide lines to illustrate that they would meet at a vanishing point. Draw several cubes in one point perspective.

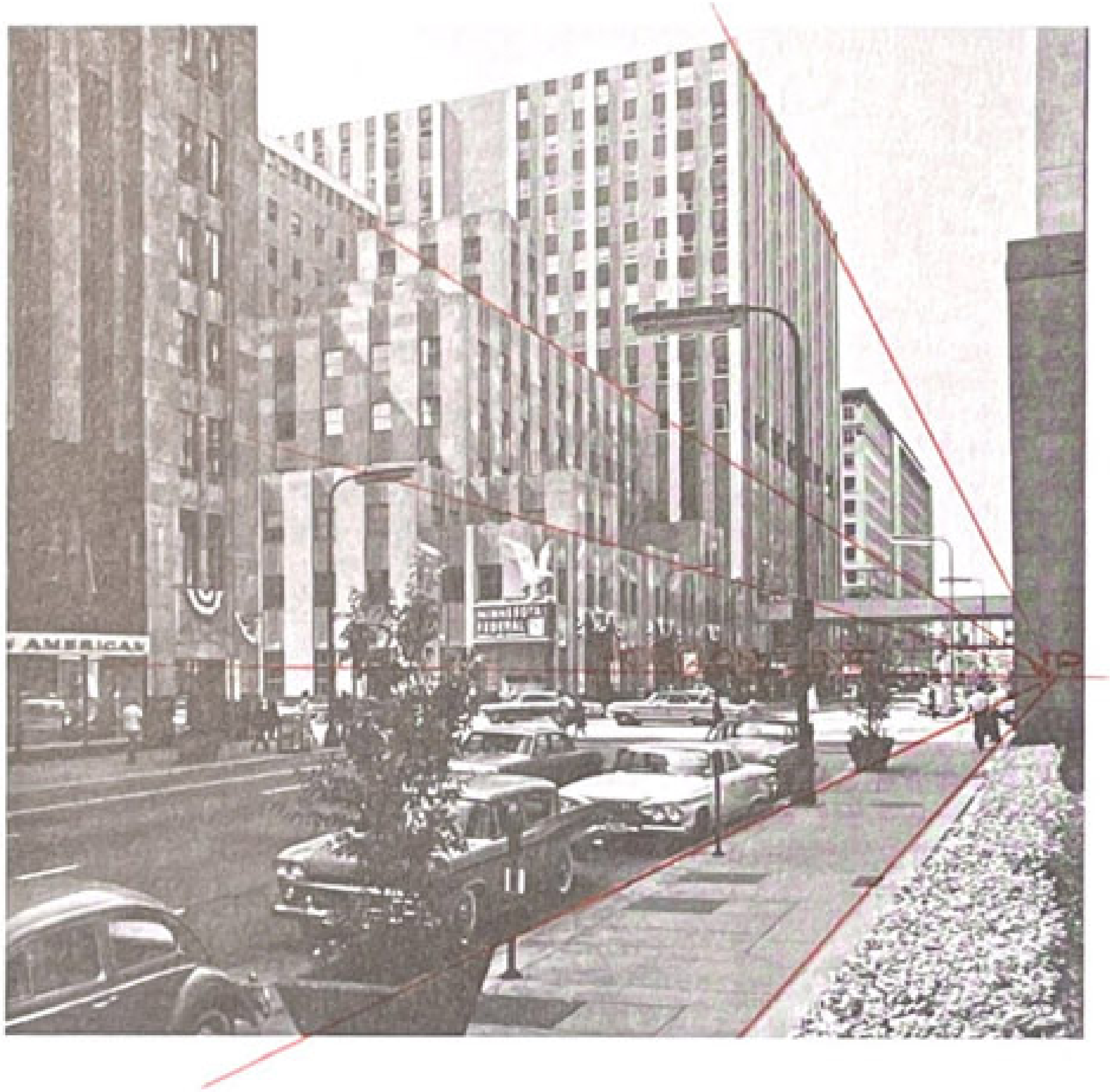
Artwork by George Terp

Eye-level

The view you get from the top of a high building is quite a bit different from the view you get on the street. The buildings and street look different because your *eye-level* is different. The view you get on a ferris wheel is another example of what happens when your eye-level changes. When you're on the ferris wheel, you can see the landscape change rapidly because your eye-level is changing rapidly. At one moment you may be looking down on the top of a tree and at another moment you may have to look up in order to see the top of the same tree.

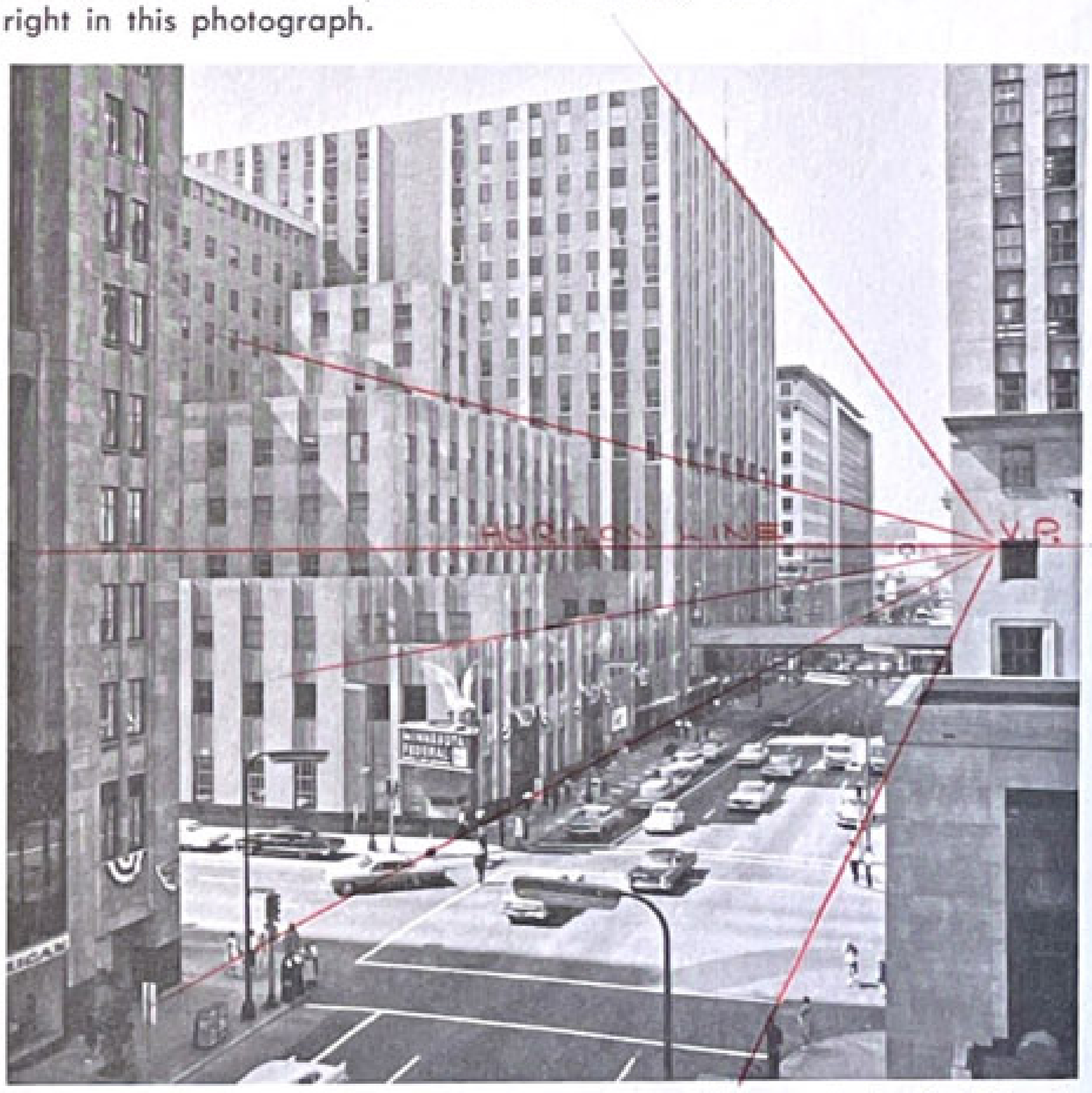
From the above, you can see that the eye-level is always level with your eyes. And, your eye-level is determined by the distance your eyes are from the ground. Even though the eye-level changes in daily life are not as dramatic as those on a ferris wheel, they do occur. Every time you sit down and stand up again your eye-level changes. And with each eye-level change, your view changes slightly. In the study of perspective we indicate this eye-level area by the use of a horizontal line on the picture plane. This line is called the horizon line. It does nothing more than indicate the distance your eyes are from the ground. To find the horizon line, you draw perspective lines and where they meet (vanishing point) you construct your horizontal horizon line. The higher the eye, the higher the point of convergence (vanishing point) and thus the higher your horizon line.

Study the examples of eye-level on these pages. Then, use the little cube you made and experiment by holding the cube above your eye-level (above your eyes) and below your eye-level (below your eyes). Notice how the eye-level influences the appearance of the cube. Observe how the lines of the sides of the cube do not converge as rapidly when you are higher above the cube, or farther below the cube.

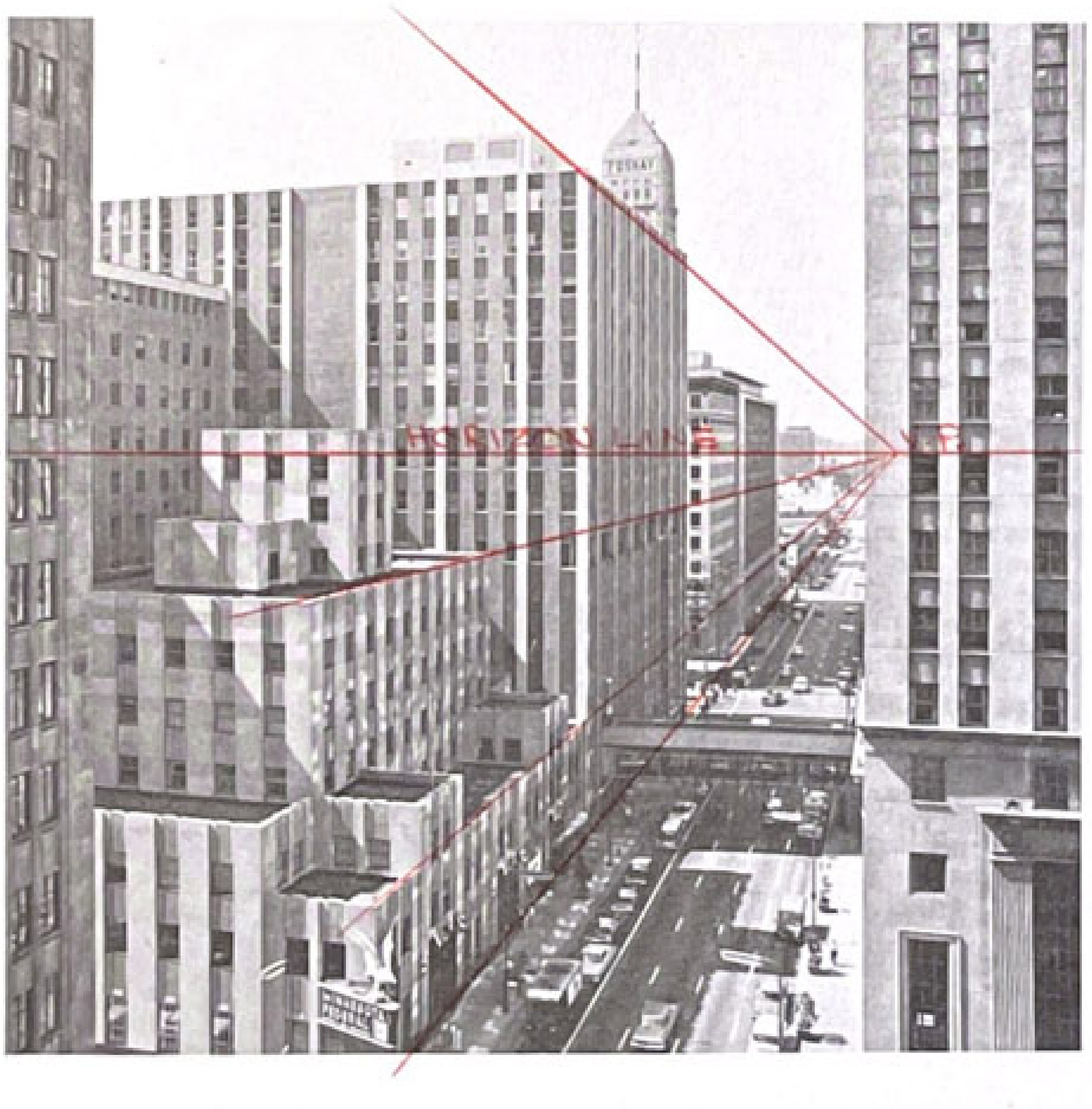


Study these three photographs of the same street scene. In each photo the eye-level or horizon line is different. This photo was taken from a first story window. Notice how the horizon line changes as we go up in the building.

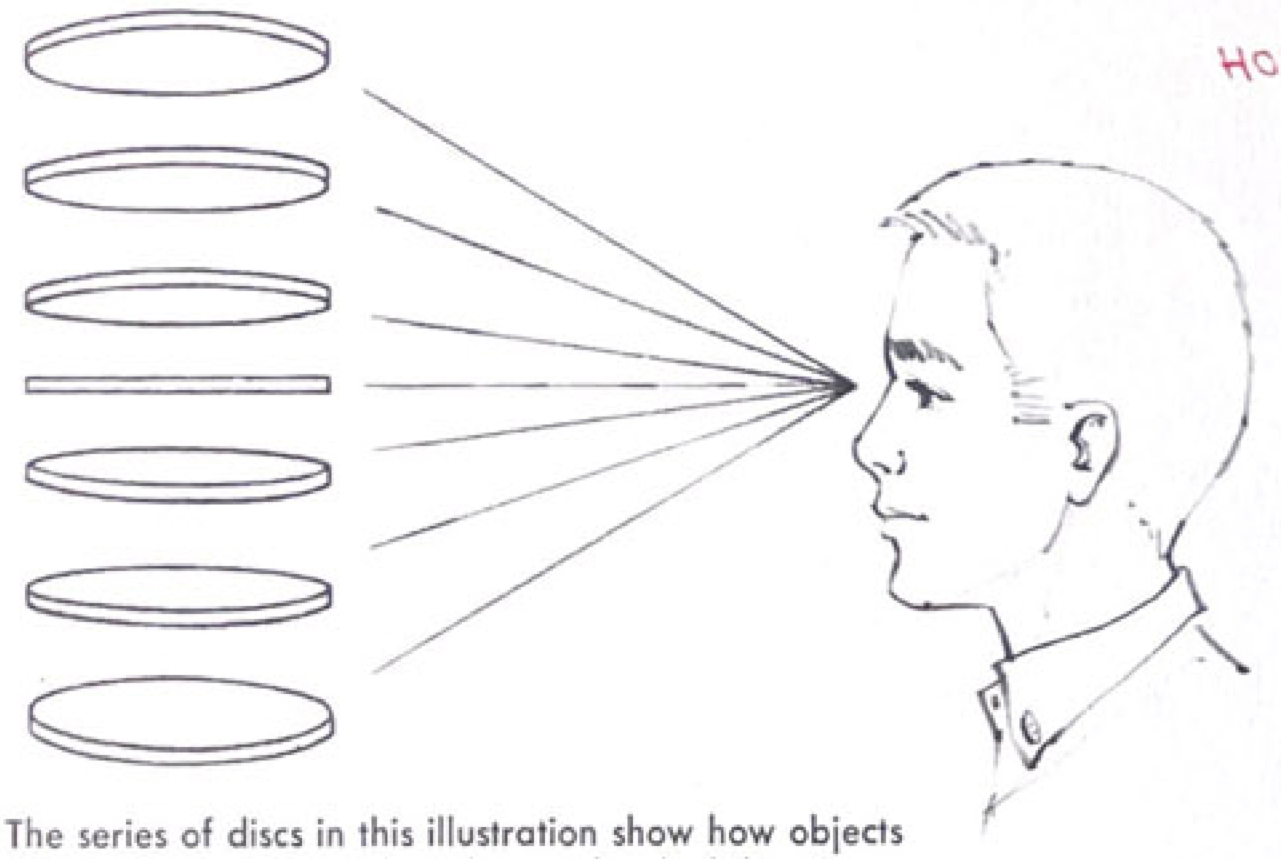
This photo was taken from a fifth story window. Compare this picture to the first one. Notice how much smaller the cars appear in this photo. Also notice that you can see the top of the flat building on the right in this photograph.



Photographs by Bob Blanch

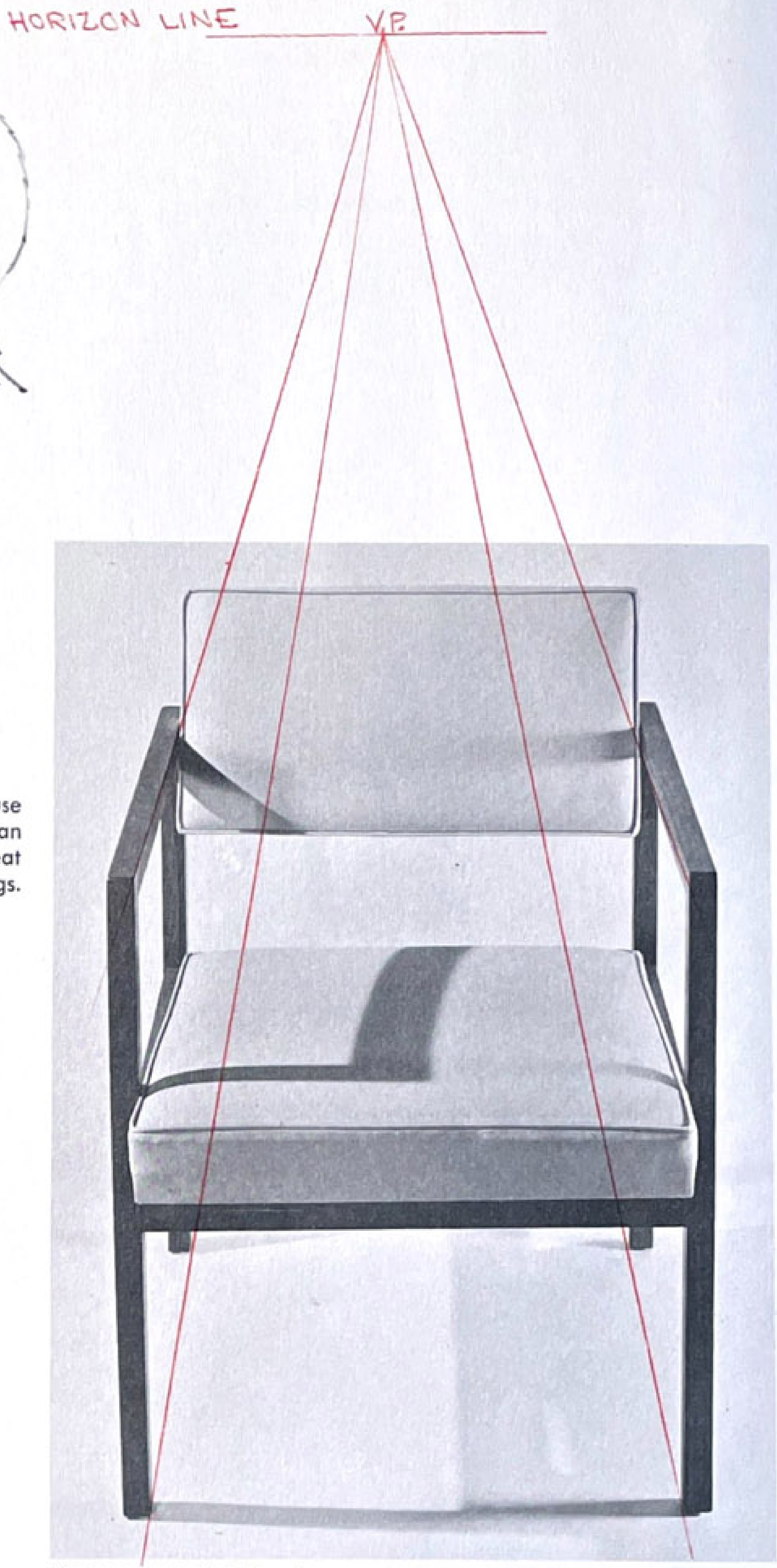


The photographer took this picture from a tenth story window. You can see farther down the street in this shot, and you can also see the roofs of the building on the left side of the street.



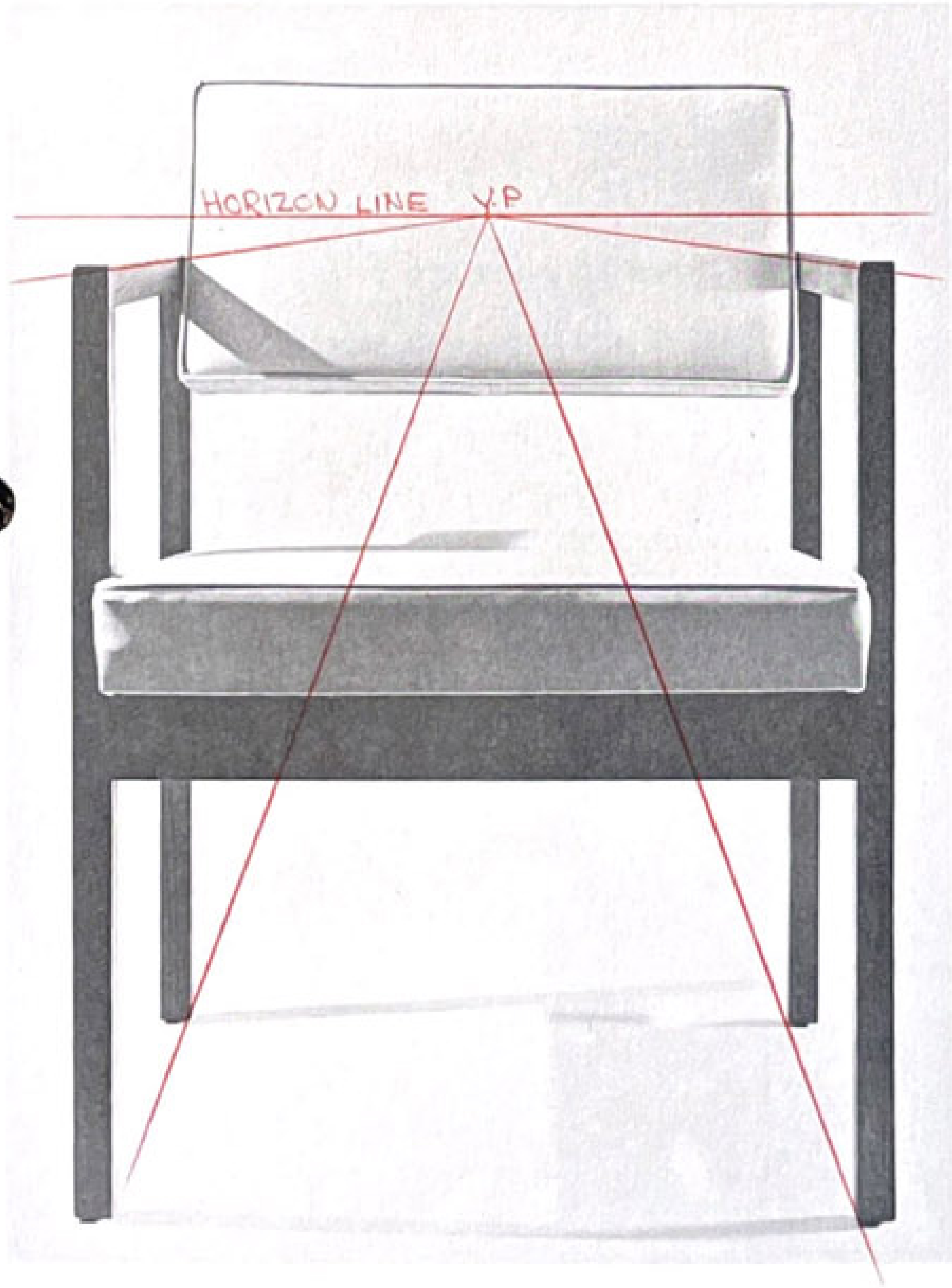
The series of discs in this illustration show how objects change appearance when the eye-level of the viewer changes. The plate in the middle is directly on the level of the boy's eyes. On a drawing, this would be the horizon line. Notice how flat this disc appears. The guide lines from the boy's eyes to the plates represent the direction his eyes would have to look to see the objects. He would have to look up above the horizon line to objects higher than his eye-level and he would have to look down below the horizon line on objects lower than his eye-level.

You seem to be looking down on this chair because the camera's eye-level was quite a bit higher than the seat of the chair. Notice how you can see a great deal of the seat, and very little of the back legs. Now the chair is below the horizon line.

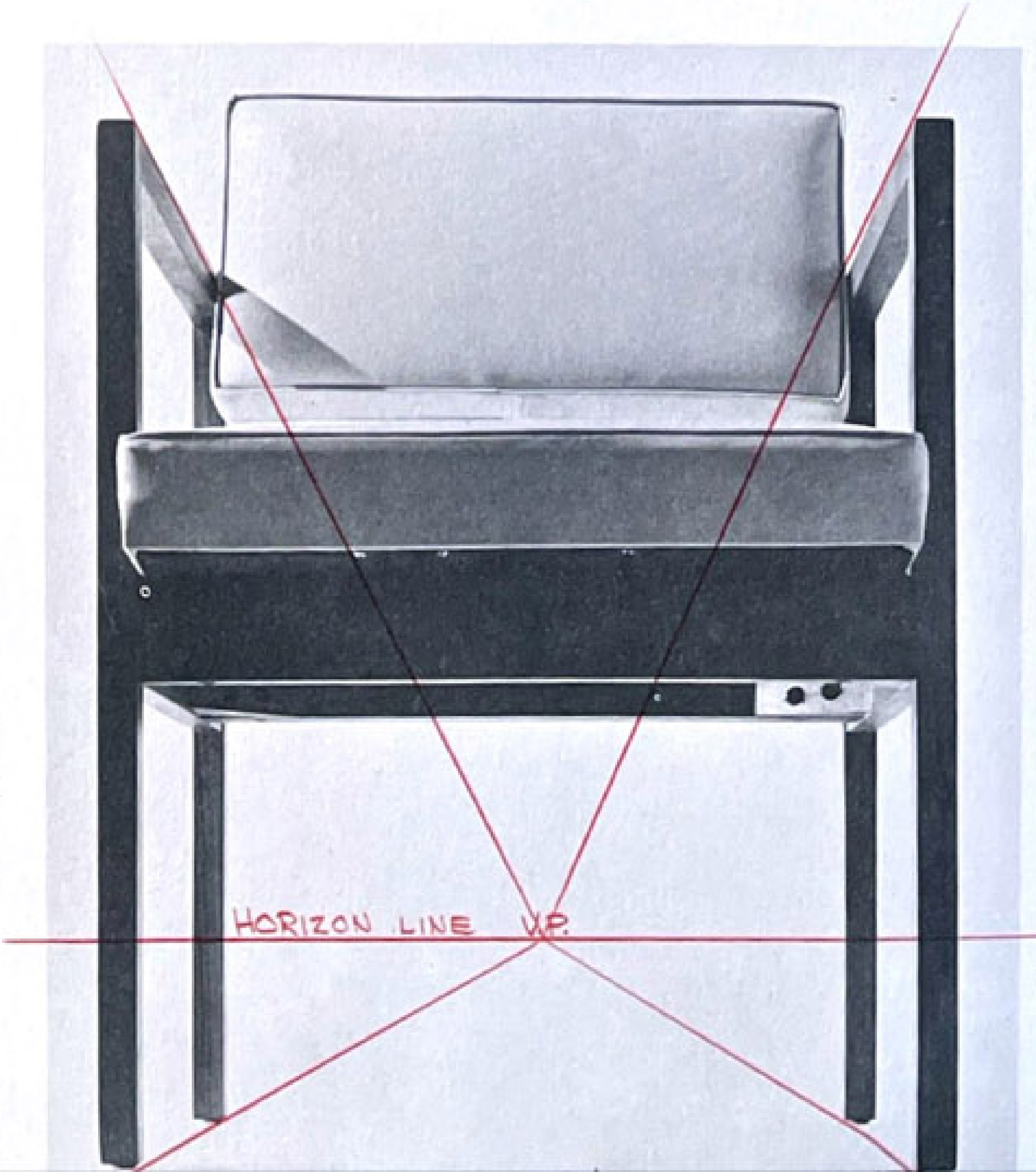


Photographs by Bob Blanch

The eye-level or horizon line in this photograph is at the same level as the chair. In other words, the camera was the same distance from the floor that the back of the chair was. Notice how the perspective lines touch each leg to form a point at which we drew the horizontal horizon line or eye-level line.



In this photograph the eye-level or horizon line is below the seat of the chair. The camera was closer to the ground than the seat of the chair was. Notice how the bottom of the chair can be seen from this view. You're "looking up at" this subject; therefore most of the chair is above the horizon line.



Two Point Perspective

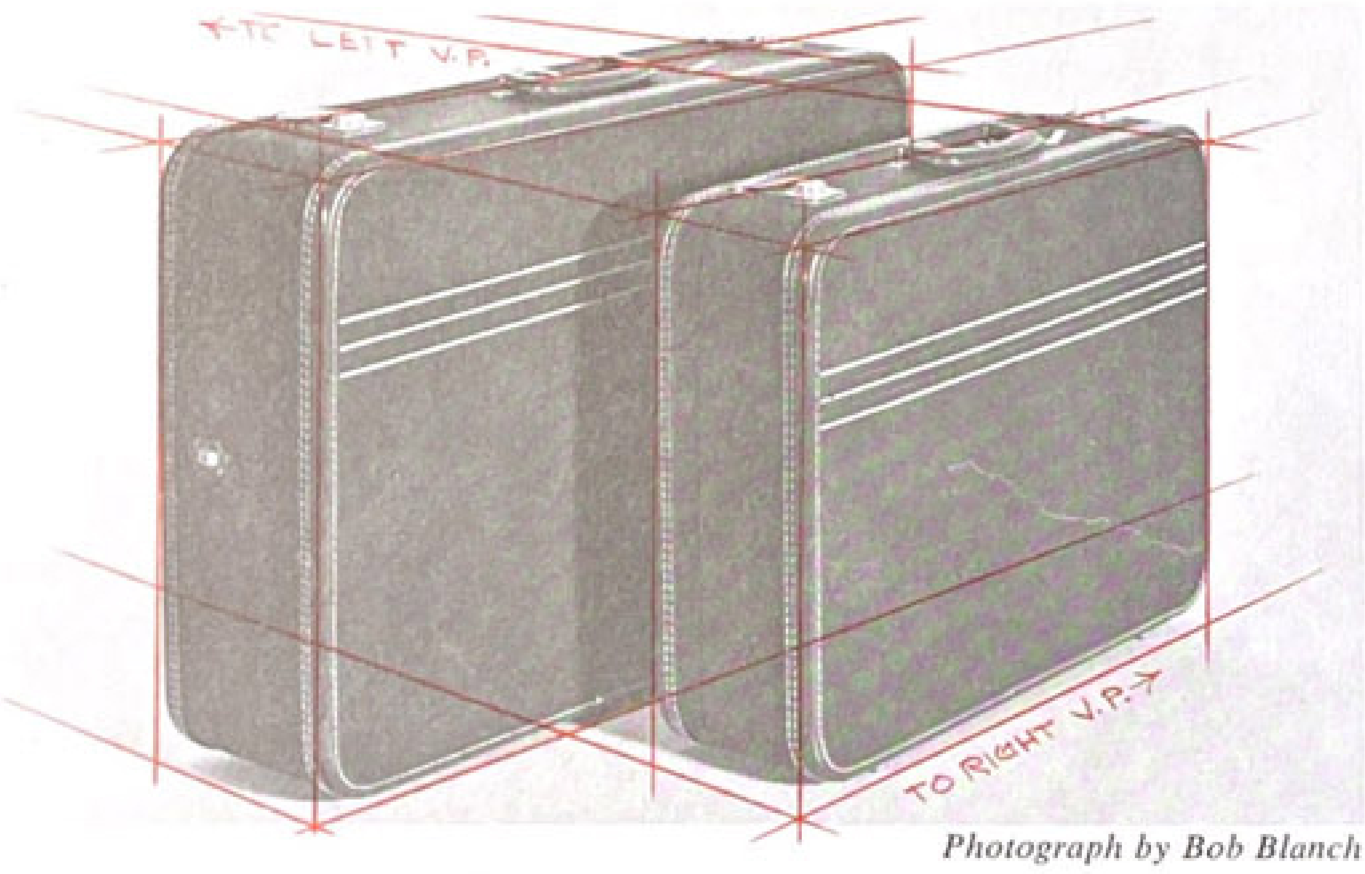
Once you learn two point perspective, you should be able to draw any geometrically shaped object. And, learning to use two point perspective will not be any more difficult than learning to use one point perspective.

The main difference between two point perspective and one point perspective is that you have two vanishing points instead of one. You will remember that the cube you just studied had one vanishing point. In other words, the converging perspective lines for the cube met at only one point. When you draw with two vanishing points, your lines will converge at *two different points*. Study the photograph of the block. You will be able to see that because it is at an angle to you, the tops and bottoms of the sides go back in different directions.

Learning to use two point perspective will be especially important to you because it is used more often than one point. In order to use one point perspective, you must be squarely in front of your subject. Look around and you'll see how few objects you view head on. If you are standing to either side of your subject, or if it is at an angle to you, you must then use two point perspective.

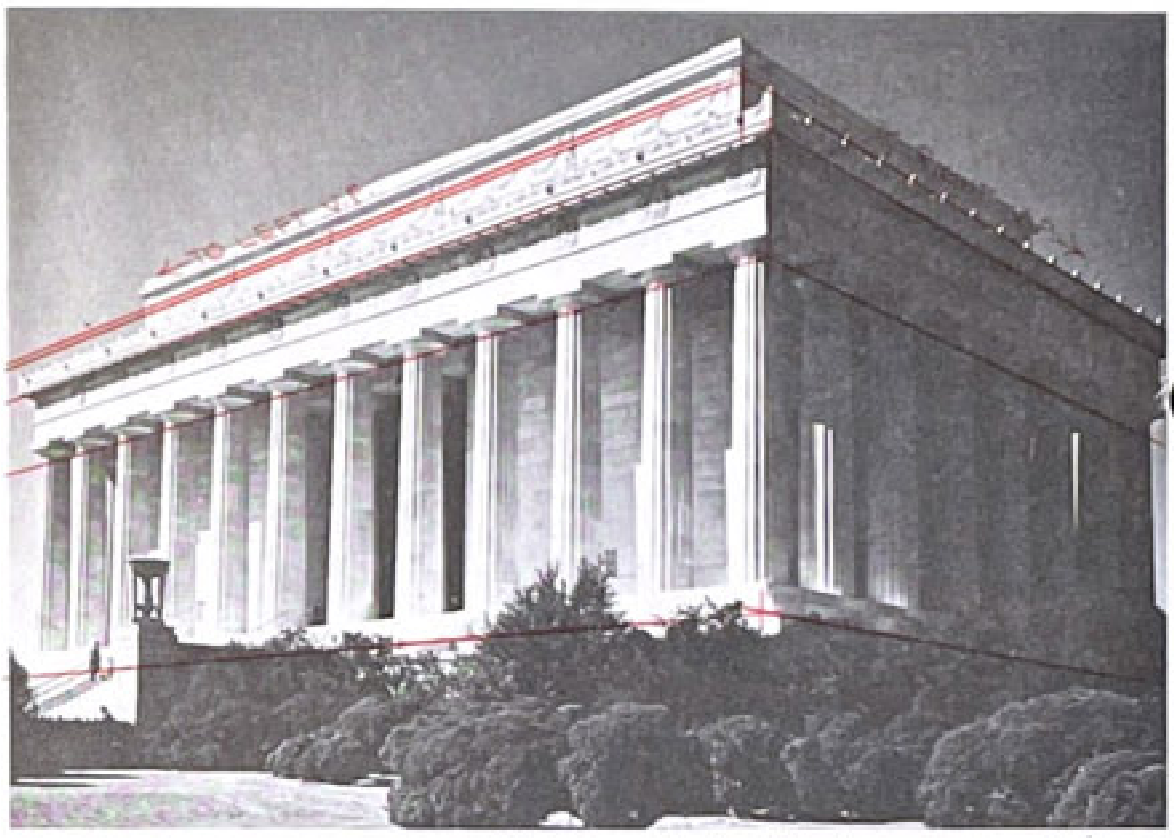
WHAT TO DO

It's just a hop and a skip from a one point drawing to a two point drawing! Set up your cube again and do three or four quick sketches of it in two point perspective. Even in your free hand sketch, draw the horizon line and vanishing points. Later check your work with T square, triangle and ruler. If you master drawing your cube in two point perspective, you'll be drawing two point room interiors with your eyes closed (almost).



Photograph by Bob Blanch

This luggage is turned at an angle to you. If you look closely you can see that the sides of the luggage that go away from the corners seem to converge slightly. The sides don't converge as dramatically as the Lincoln Memorial's because the luggage is much smaller.

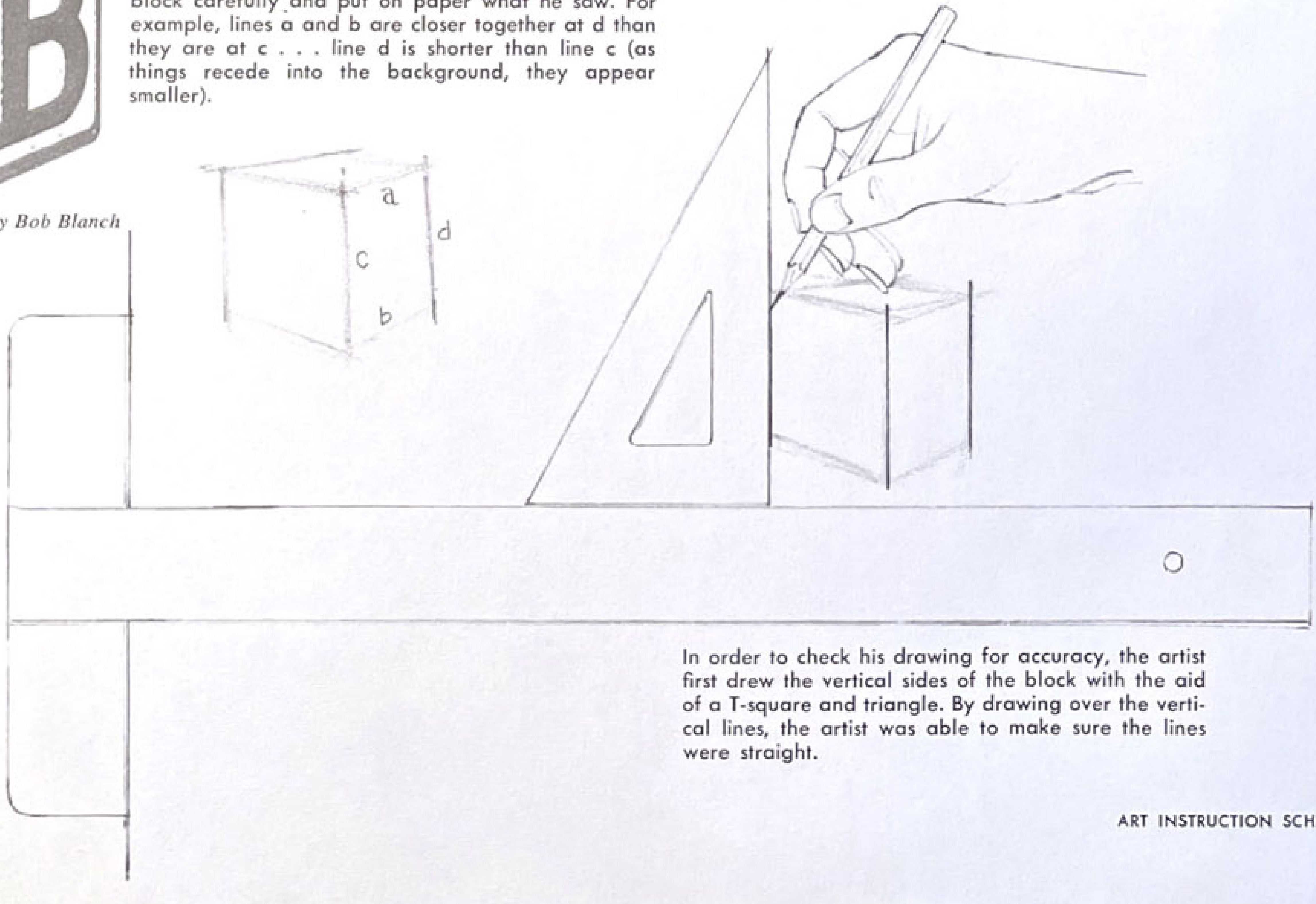


Photograph by H. Armstrong Roberts

The corner of the Lincoln Memorial is the part of the building closest to you. Notice how the top and bottom of each side come closer together (converge) as they get farther and farther away from the corner. The artist drew lines over the top and bottom of both sides to show that these lines will converge. If the perspective lines were extended even farther, they would illustrate that each side has its own vanishing point. Because each side has its own vanishing point, we say this building is in two point perspective.

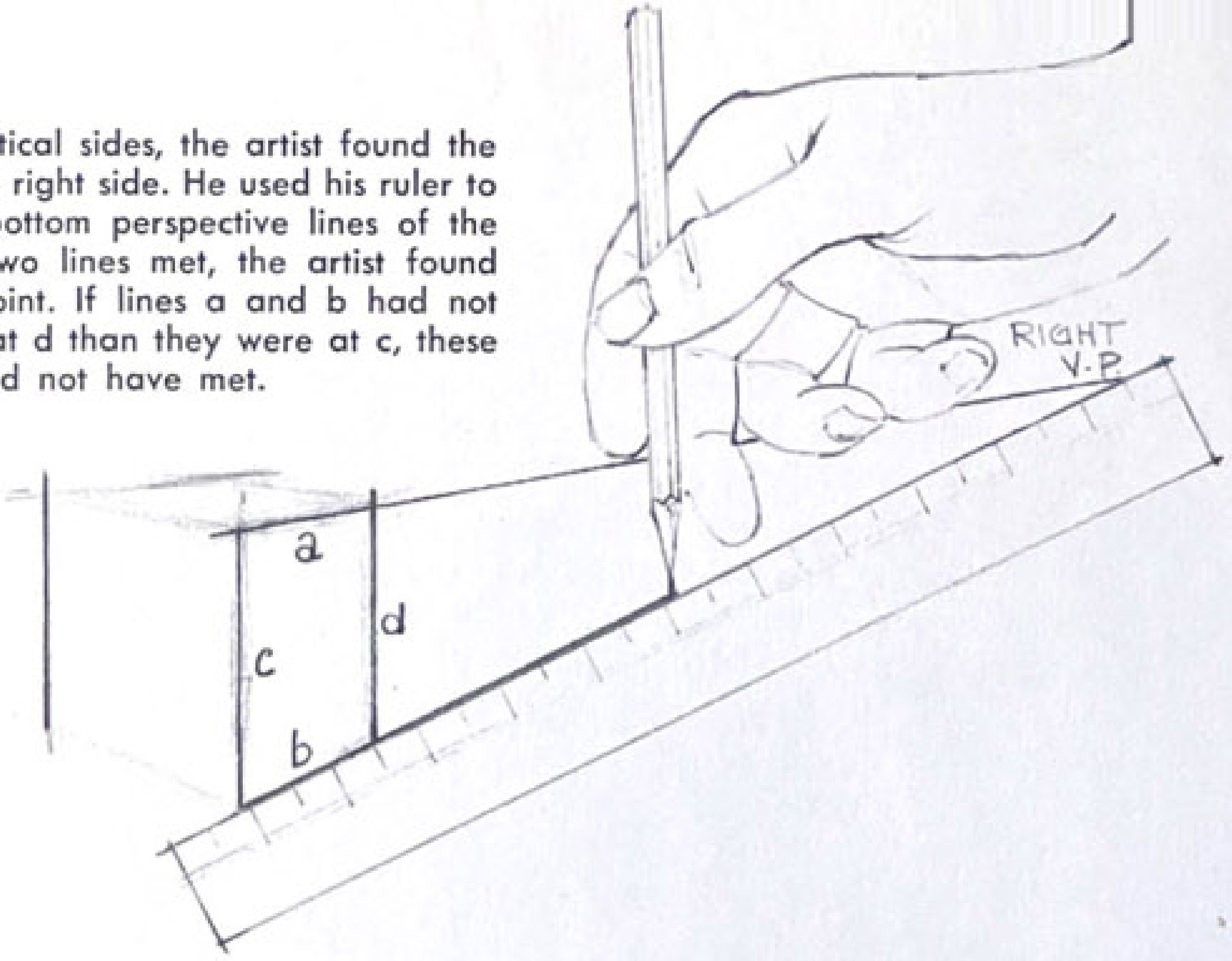
Photograph by Bob Blanch

First the artist made a freehand sketch of the block. He didn't use a ruler or a triangle to keep the lines perfectly straight. He was primarily concerned with establishing the cube-shaped form. He observed the block carefully and put on paper what he saw. For example, lines a and b are closer together at d than they are at c . . . line d is shorter than line c (as things recede into the background, they appear smaller).

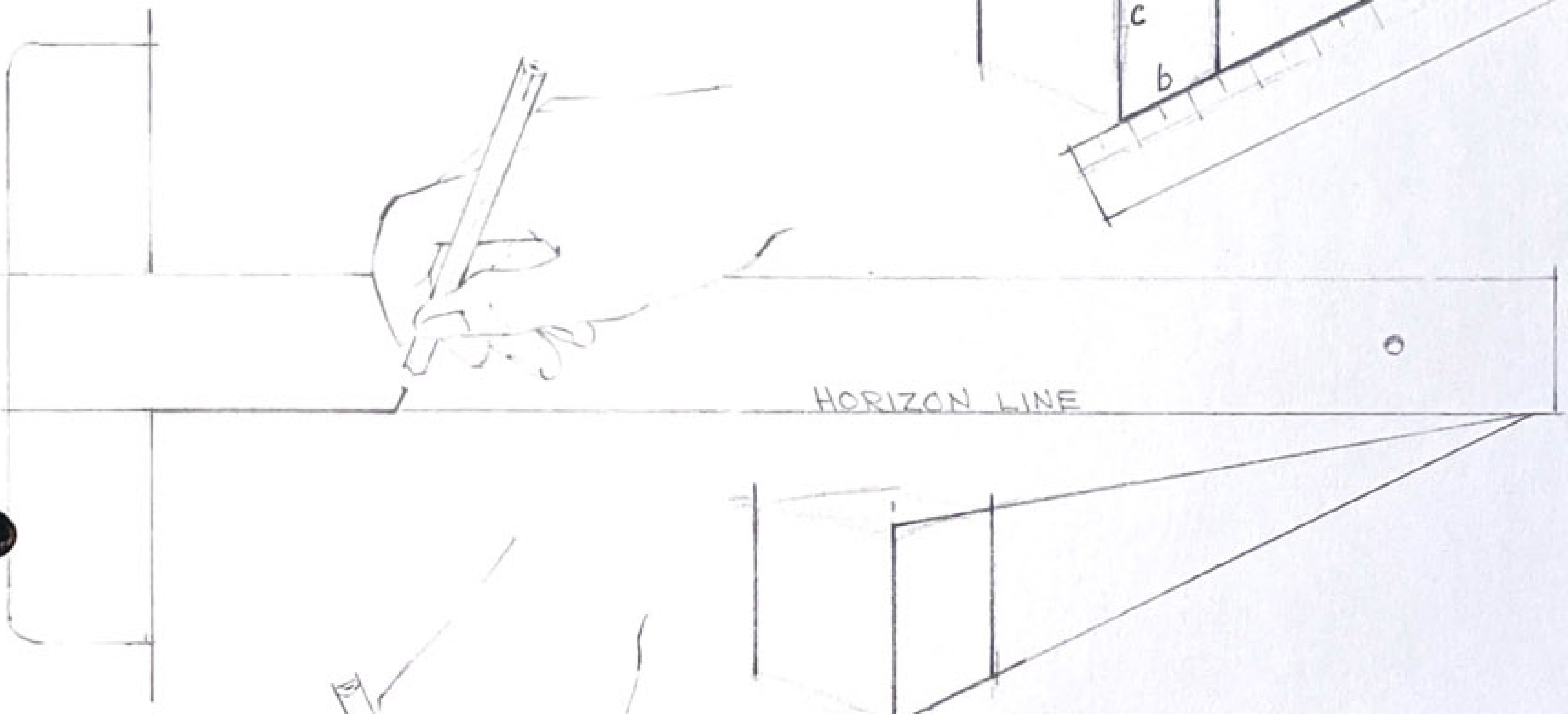


In order to check his drawing for accuracy, the artist first drew the vertical sides of the block with the aid of a T-square and triangle. By drawing over the vertical lines, the artist was able to make sure the lines were straight.

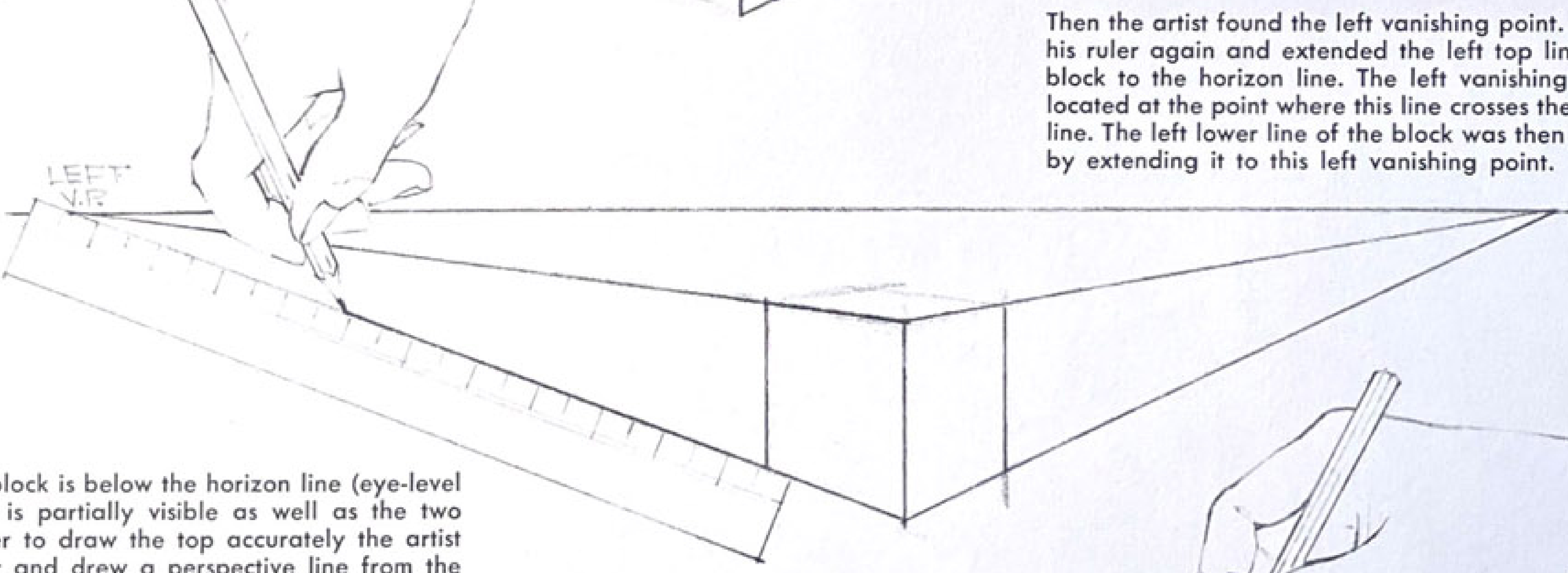
After he drew the vertical sides, the artist found the vanishing point for the right side. He used his ruler to extend the top and bottom perspective lines of the block. Where these two lines met, the artist found the right vanishing point. If lines a and b had not been closer together at d than they were at c, these perspective lines would not have met.



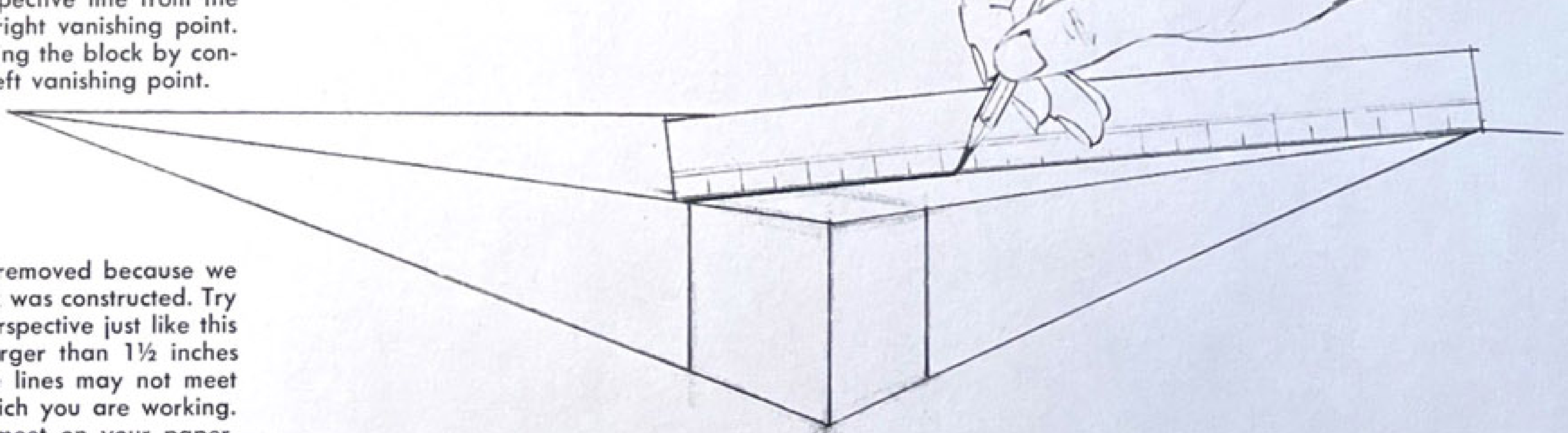
The vanishing point for the right side shows us where the horizon line should be drawn. Notice how the artist used his T-square to draw an accurate horizontal horizon line through this right vanishing point.



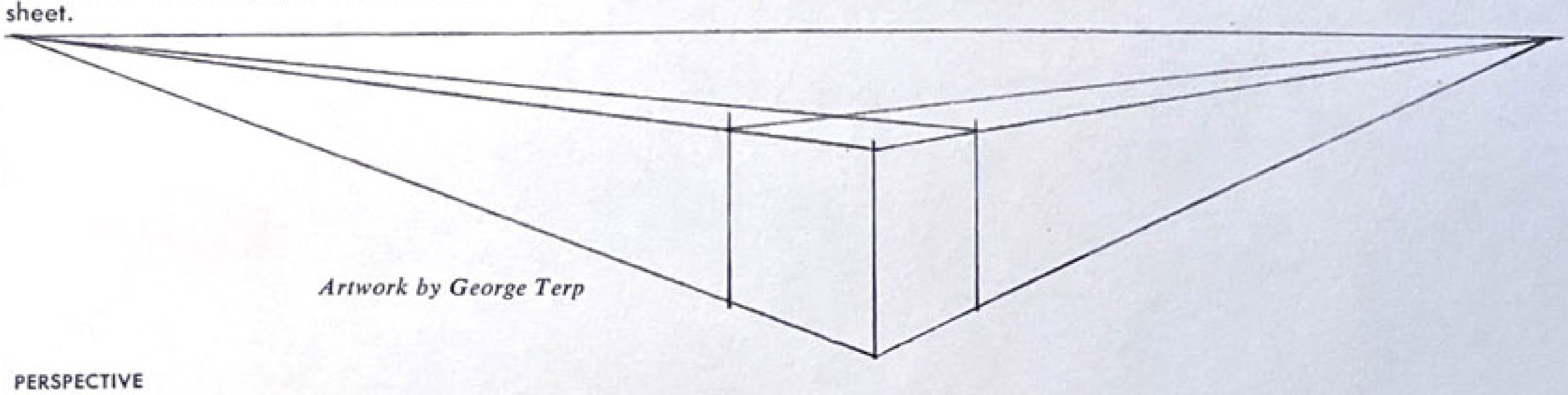
Then the artist found the left vanishing point. He used his ruler again and extended the left top line of the block to the horizon line. The left vanishing point is located at the point where this line crosses the horizon line. The left lower line of the block was then checked by extending it to this left vanishing point.



Because the block is below the horizon line (eye-level line) the top is partially visible as well as the two sides. In order to draw the top accurately the artist used his ruler and drew a perspective line from the left corner of the block to the right vanishing point. The artist then finished constructing the block by connecting the right corner to the left vanishing point.



The guide lines have not been removed because we wanted you to see how the block was constructed. Try drawing a cube in two point perspective just like this one. Don't make your block larger than 1½ inches high. If you do, the perspective lines may not meet on the sheet of paper upon which you are working. If your perspective lines don't meet on your paper, add a sheet of scratch paper to that side of your first sheet.



Artwork by George Terp

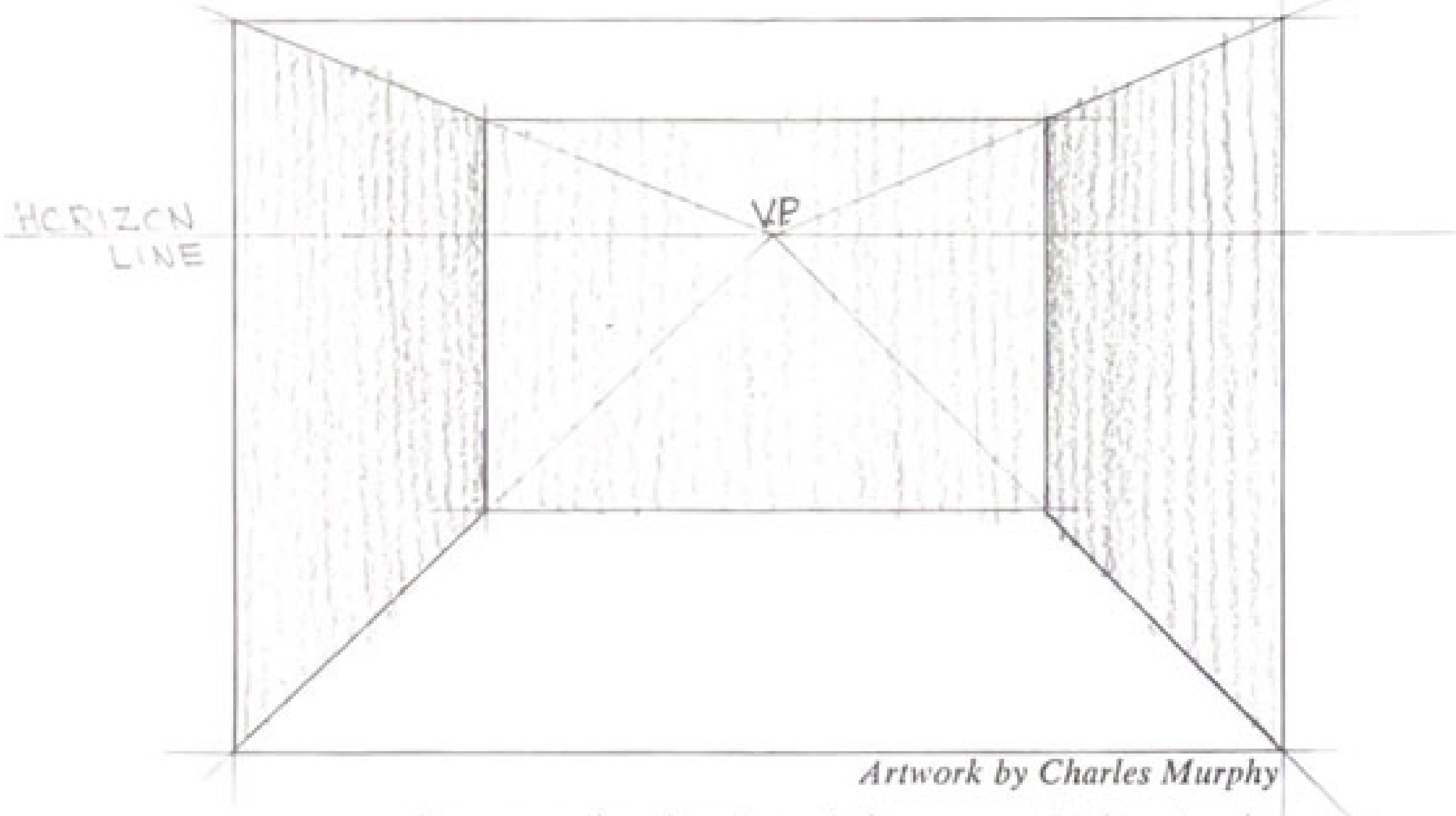
Interiors

Whether you specialize in commercial art or fine art you will have many opportunities to draw interior scenes. Interiors can be settings for figure and still life drawings. By using the proper furniture and woodwork, you can create any locale or any period. And while you will be able to get a great deal of variety in these interior scenes, the basic rules for drawing interiors are the same. In fact, the rules for drawing interiors are actually similar to the rules you learned when you drew the cube.

Study the examples of one and two point interiors on these pages. Notice that an interior is similar to the inside of an open box. The procedures you used to draw one point cubes and two point cubes will help you learn to draw interiors. After you've read the material and studied the pictures, try drawing your own living room. Concentrate on the main structure of the room – don't try to draw the furniture. First draw the room in one point perspective and then draw the room in two point perspective. If you have practiced and learned perspective this far you should have no trouble.

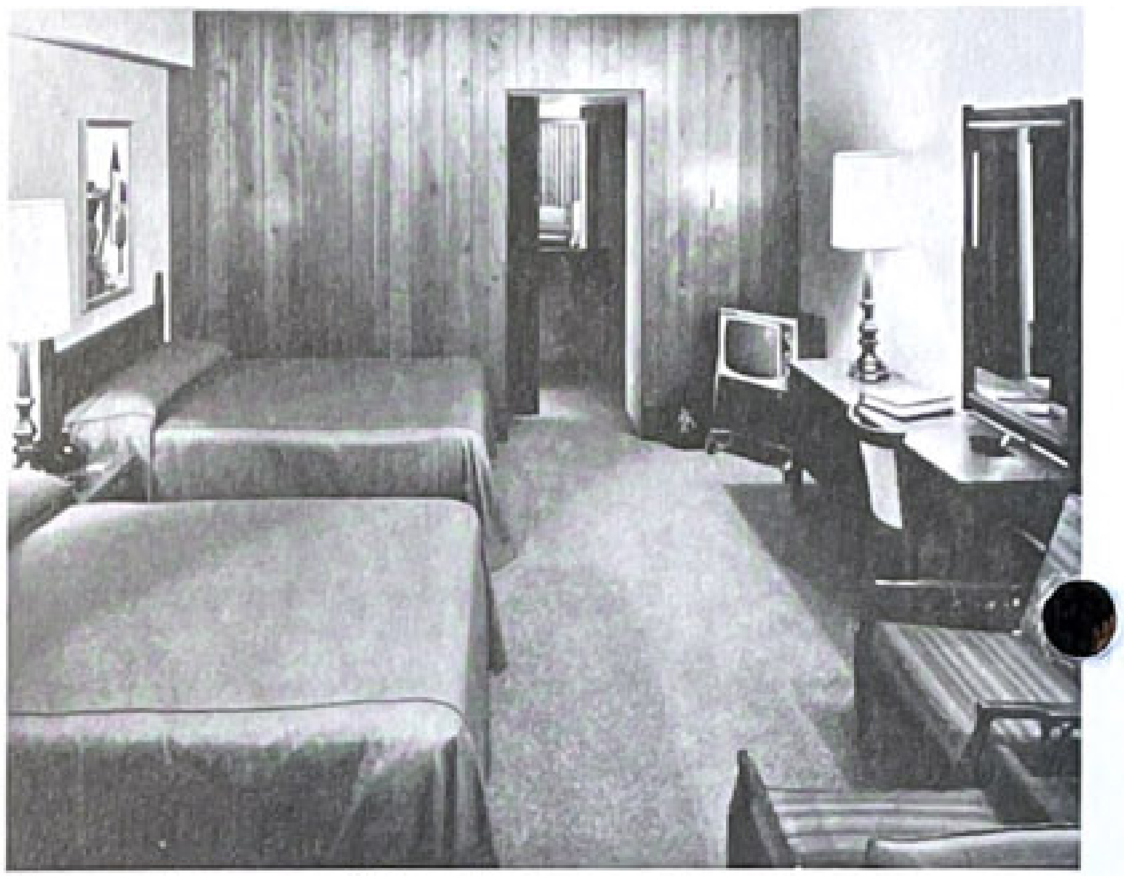
WHAT TO DO

Try a one point drawing of your living room or study room. Take your sketch book and station yourself so that you are directly across from the center of the opposite wall. Draw the angle of the floor lines and ceiling lines. Don't try to include furniture or other minor elements. When the sketch is finished, go to your drawing board and correct the lines with your T square and triangle. Find the vanishing point and horizon line.



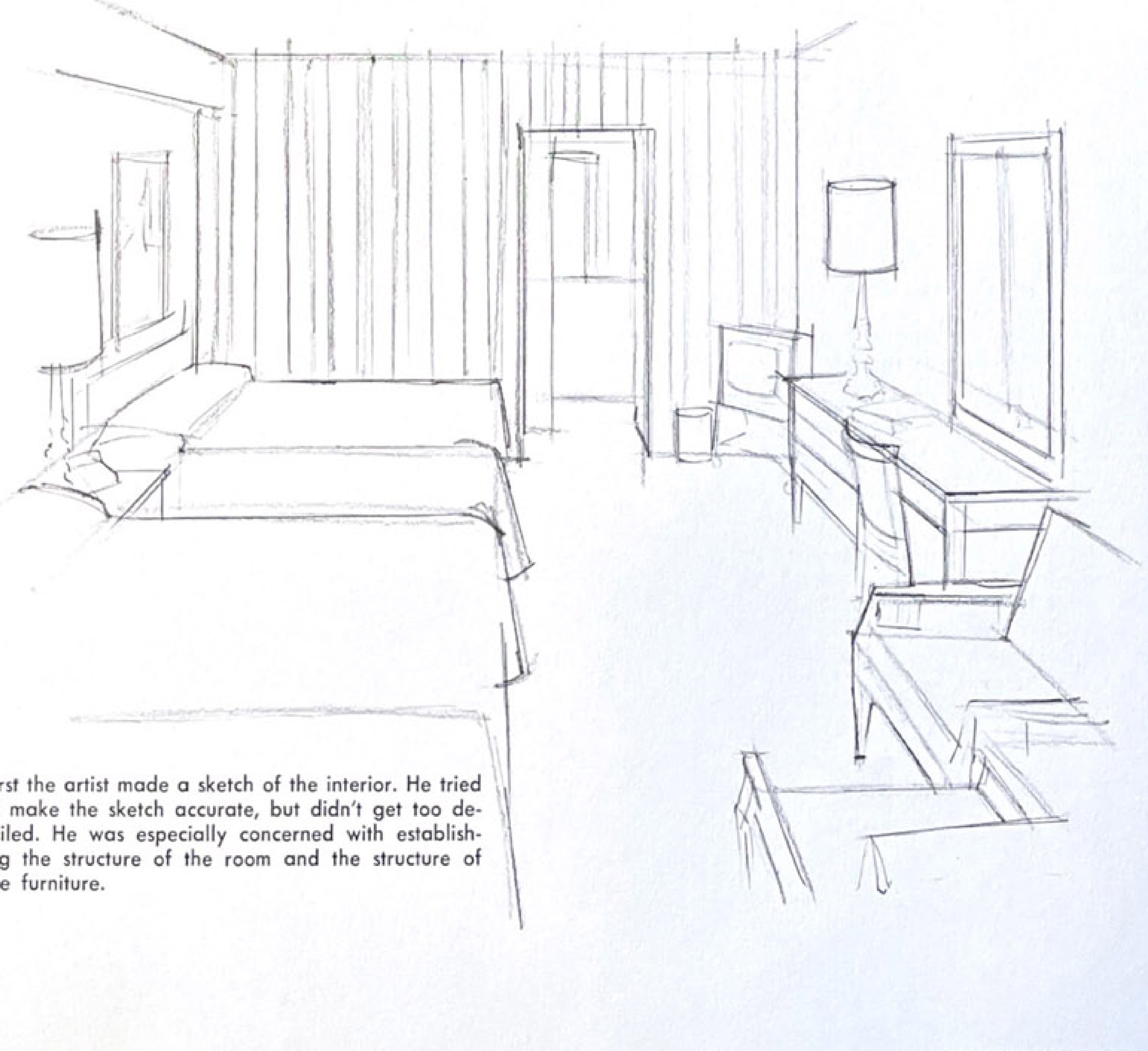
Artwork by Charles Murphy

Compare the drawing of the one point box to the one point interior. Notice that the artist was able to give the illusion of an interior just by removing the front side of the box. Looking into a room is like looking into a box. So if you can draw a one point cube, you'll have no trouble drawing an interior in one point perspective.

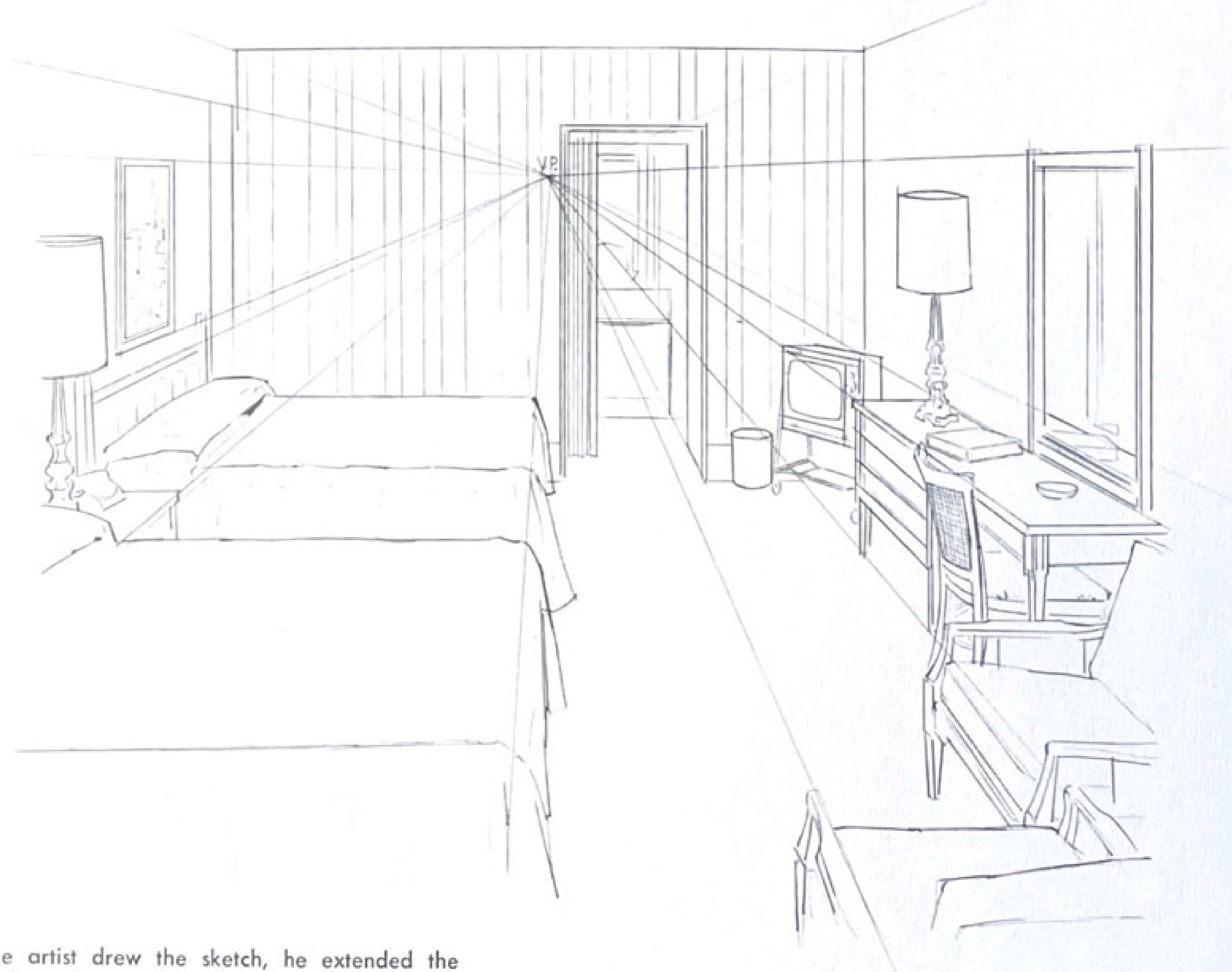


Photograph courtesy of Dayton's

Study this photograph. This is the model the artist used when he drew the one point interior. As you study the material, refer to the photo often. If you have any trouble drawing this one point interior, go back and review drawing the one point cube.



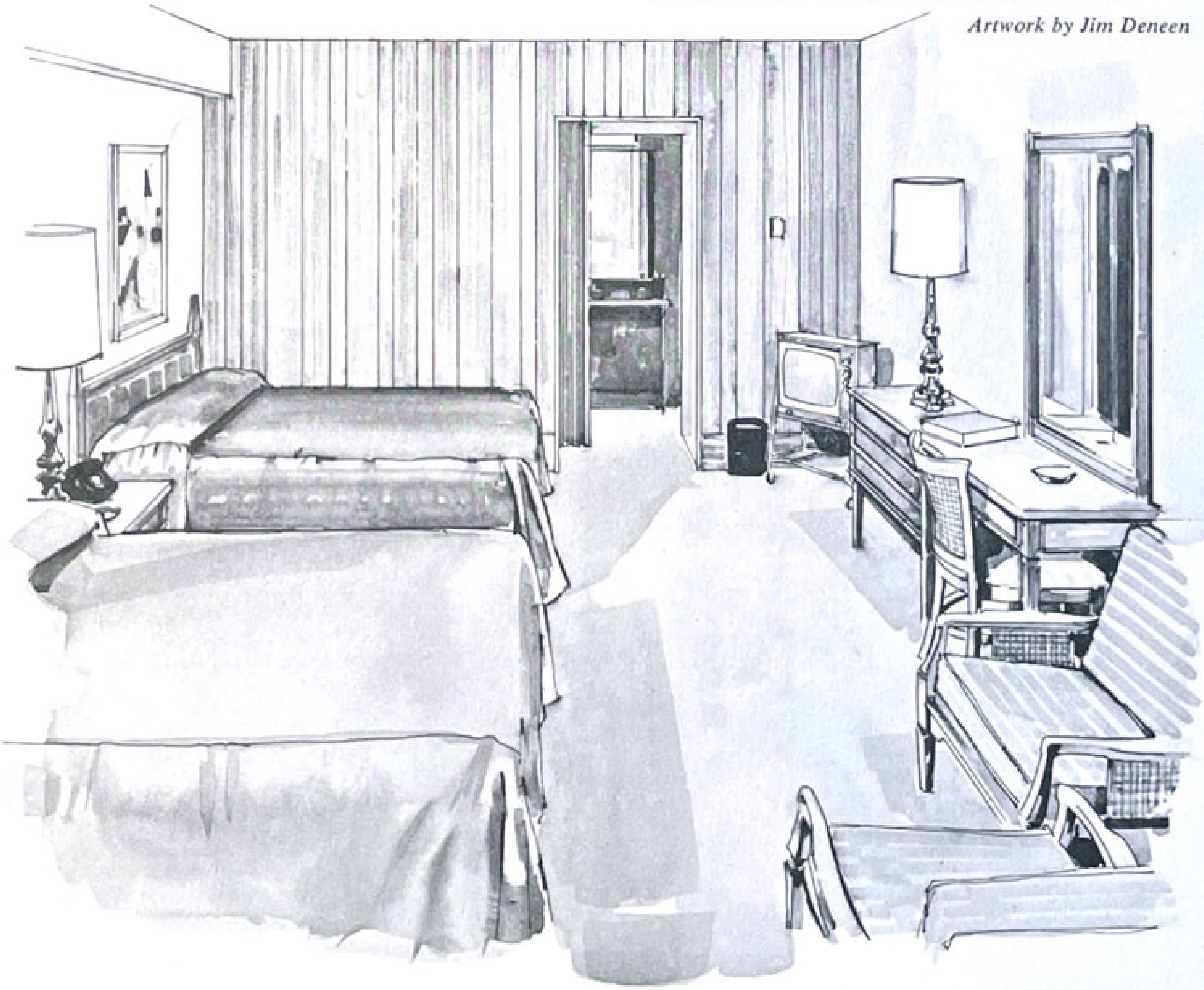
First the artist made a sketch of the interior. He tried to make the sketch accurate, but didn't get too detailed. He was especially concerned with establishing the structure of the room and the structure of the furniture.

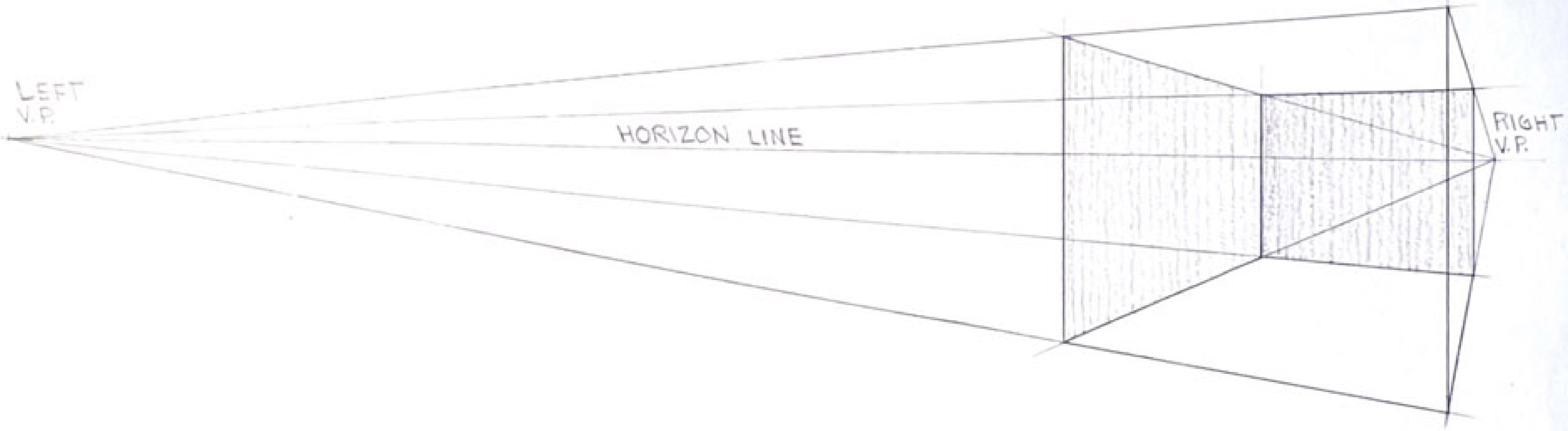


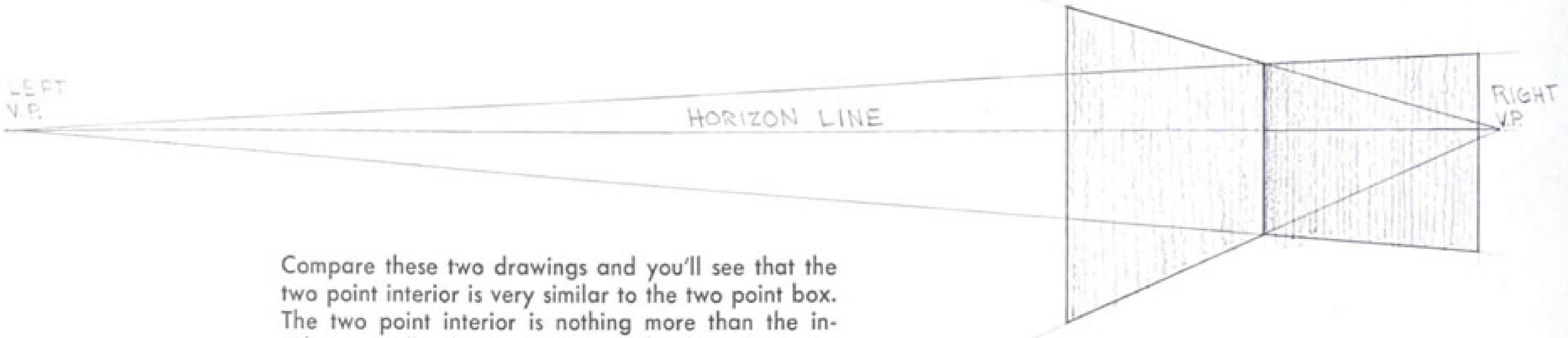
After the artist drew the sketch, he extended the lines of the ceiling and the important lines of some of the objects. Where these lines met, the artist found the vanishing point. All the extended parallel lines should meet at one vanishing point. Those that don't must be changed so they do meet at the vanishing point.

The artist rendered the drawing in transparent wash and ink. Compare his drawing with the photograph. Notice how the artist emphasized the important things in the drawing and ignored the minor details.

Artwork by Jim Deneen

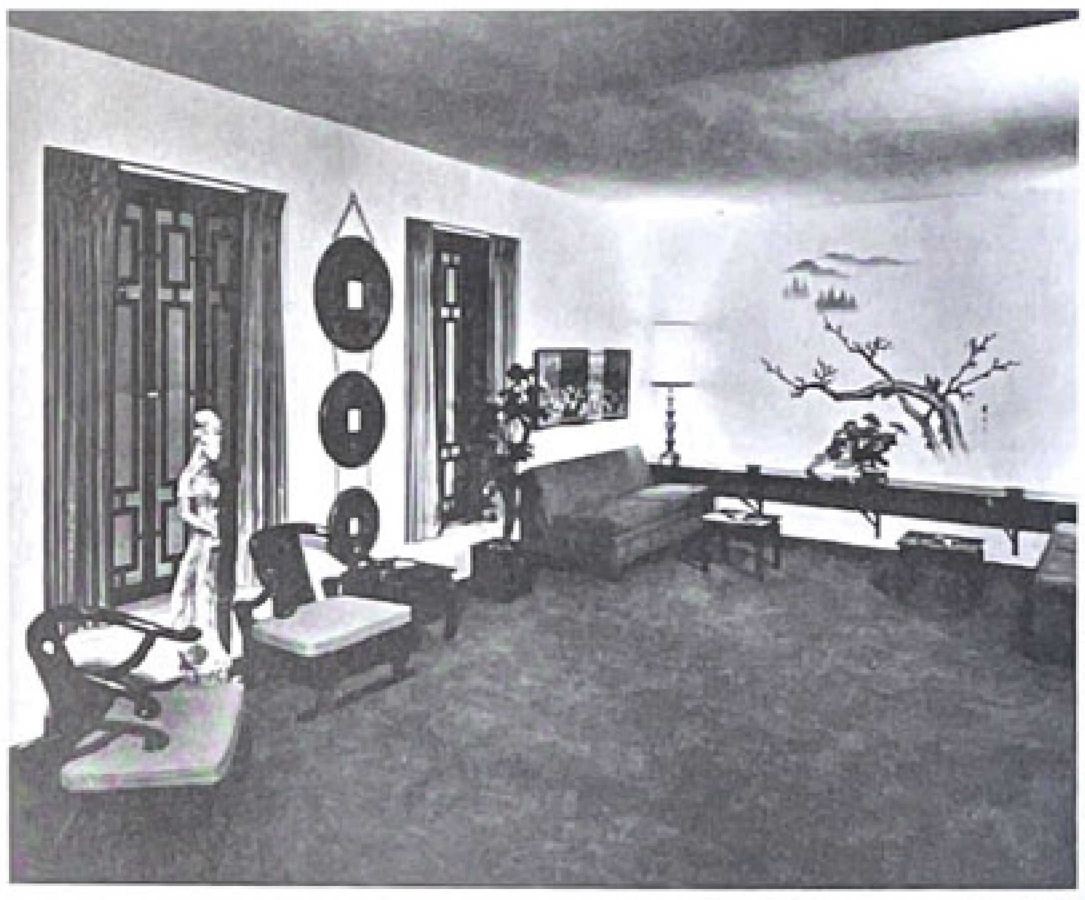






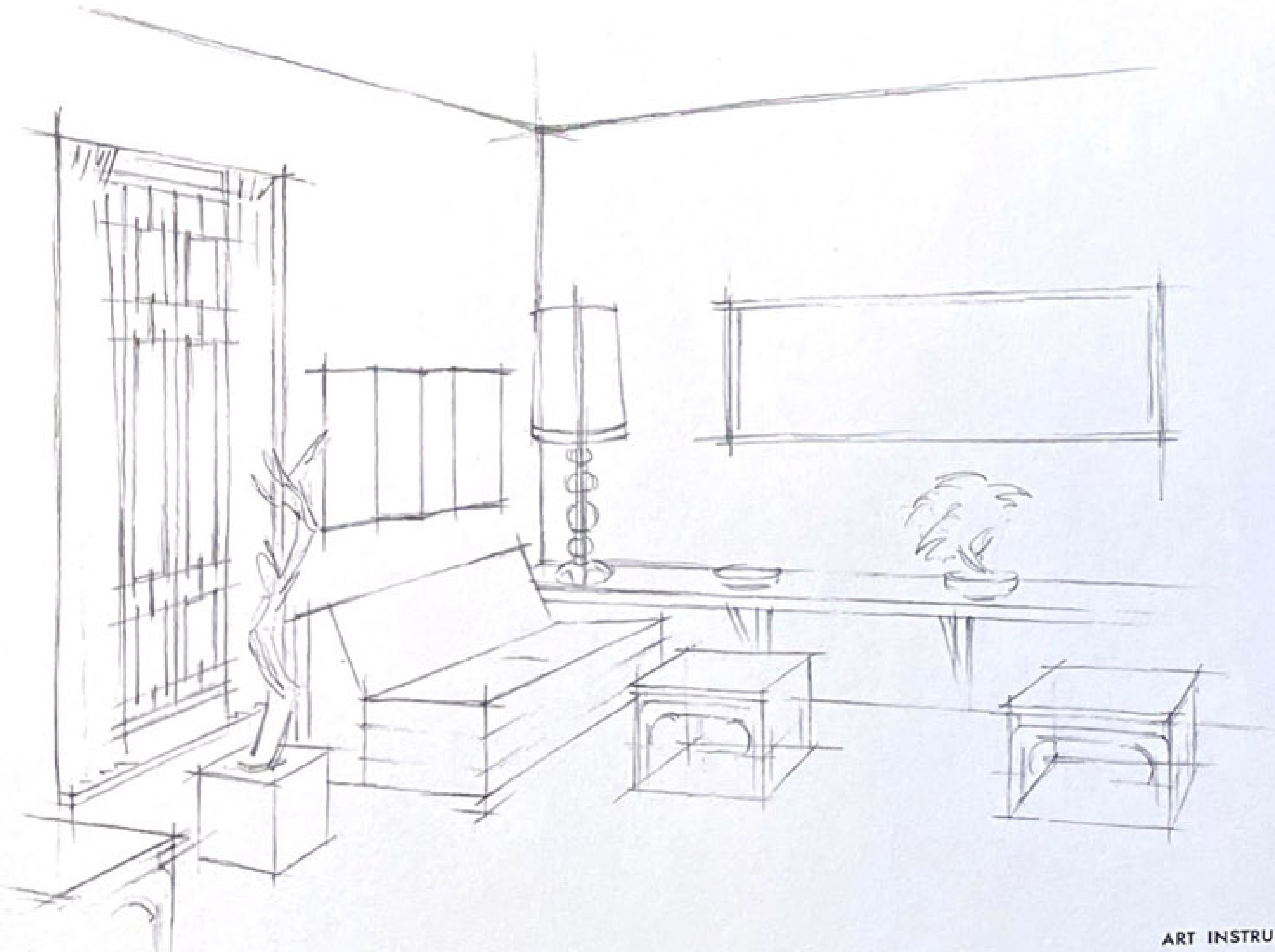
Compare these two drawings and you'll see that the two point interior is very similar to the two point box. The two point interior is nothing more than the inside two walls of a two point box that have been exposed by removing two walls.

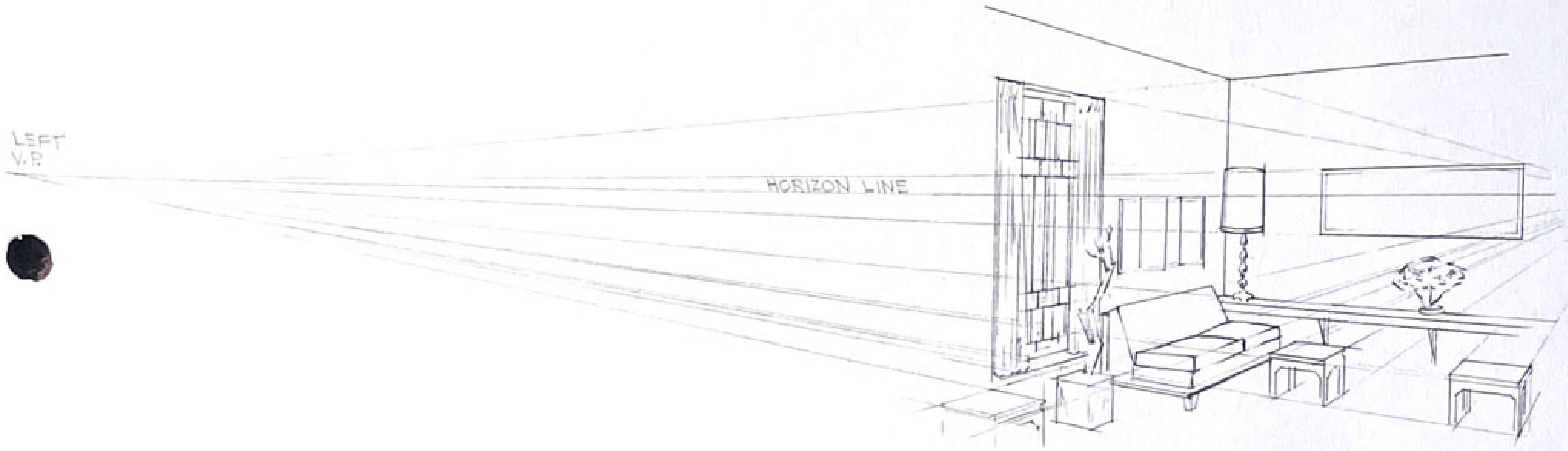
This is the photograph the artist worked from when he drew the two point interior. The drawing was done in two point because the artist was facing a corner and the walls were at angles to him.



Photograph courtesy of Dayton's

First the artist made a sketch of the interior. He started by sketching the walls of the room. After he indicated the ceiling and corner, the artist added the important objects in the room, changing those he did not like, to make his illustration more pleasing.





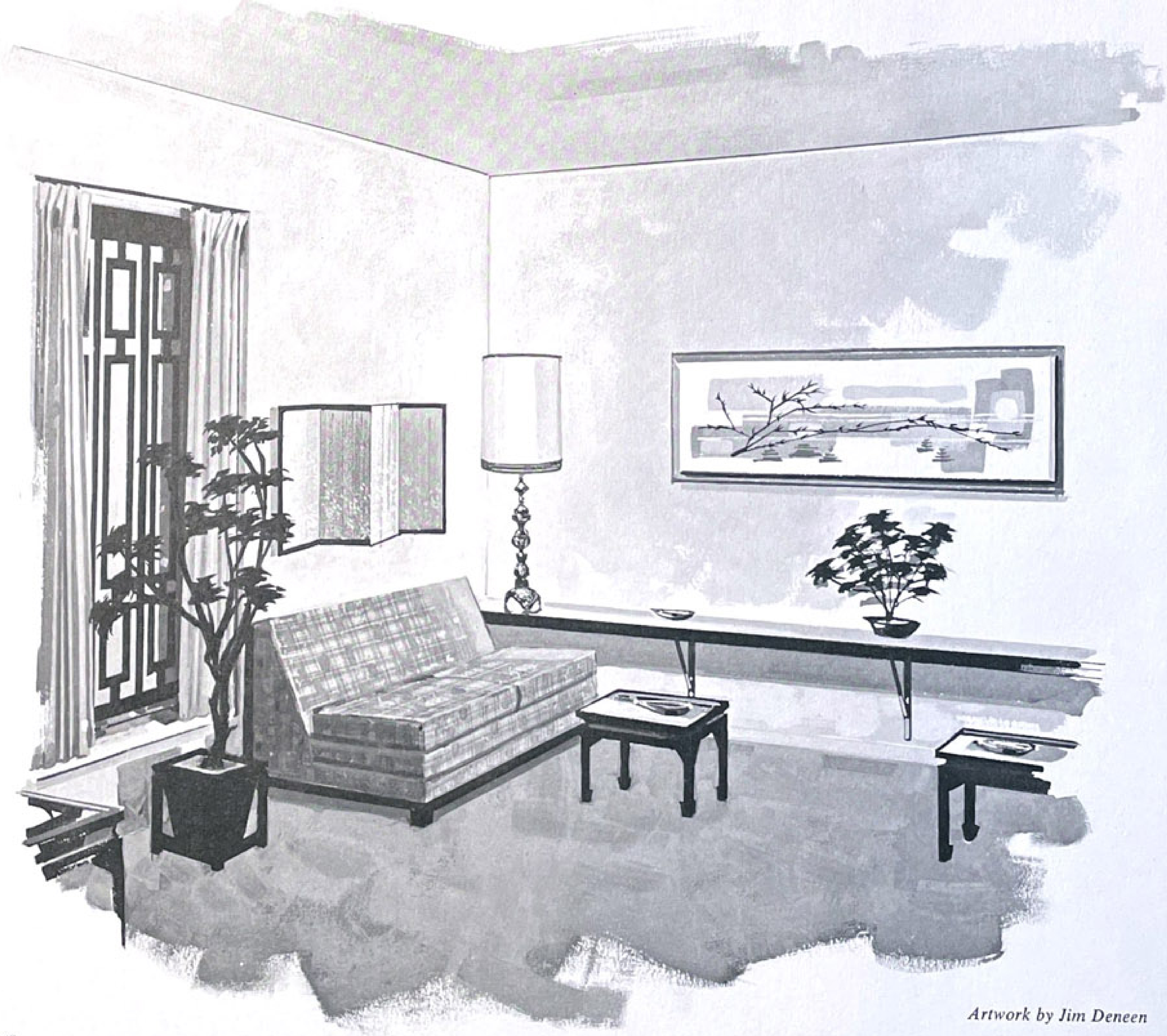
Next, the artist checked to see if his drawing was correct. He started by extending the perspective line of the ceiling on the left side of the corner. Then, to find the vanishing point on the right (used for the left side of the room), the artist extended a perspective line along the top of the couch (because the floor could not be seen). This was the longest, lowest line on the left side of the room. In order to find the vanishing point on the left side (used for the right wall), the artist drew in the horizon line (eye-level line) through the vanishing point on the right.

The final drawing was done in opaque wash. Notice how much dry brush was used in the drawing. He created this realistic drawing by first sketching his subject, then finding the vanishing points and finally checking all of the lines to make sure they were drawn correctly.

Then he extended the top of the right wall ceiling line down to the horizon line. Where the line met the horizon line, he found the second vanishing point. With these two vanishing points located, the artist was able to draw perspective lines from the objects in the room to the vanishing points to check the accuracy of the perspective. Then, he corrected the vertical and horizontal lines, and erased the perspective lines in preparation for finishing the drawing. This artwork was reproduced smaller so you could see the vanishing points.

WHAT TO DO

Use the same room that you did for your one point practice but this time, make a two point drawing. Station yourself in a corner of the room. Also, sit on the floor or on a low stool so you use a horizon line that is different than your first sketch. Remember to correct your sketch with T square and triangle (straighten and clean up the lines; check that both points are on the horizon line.



Artwork by Jim Deneen

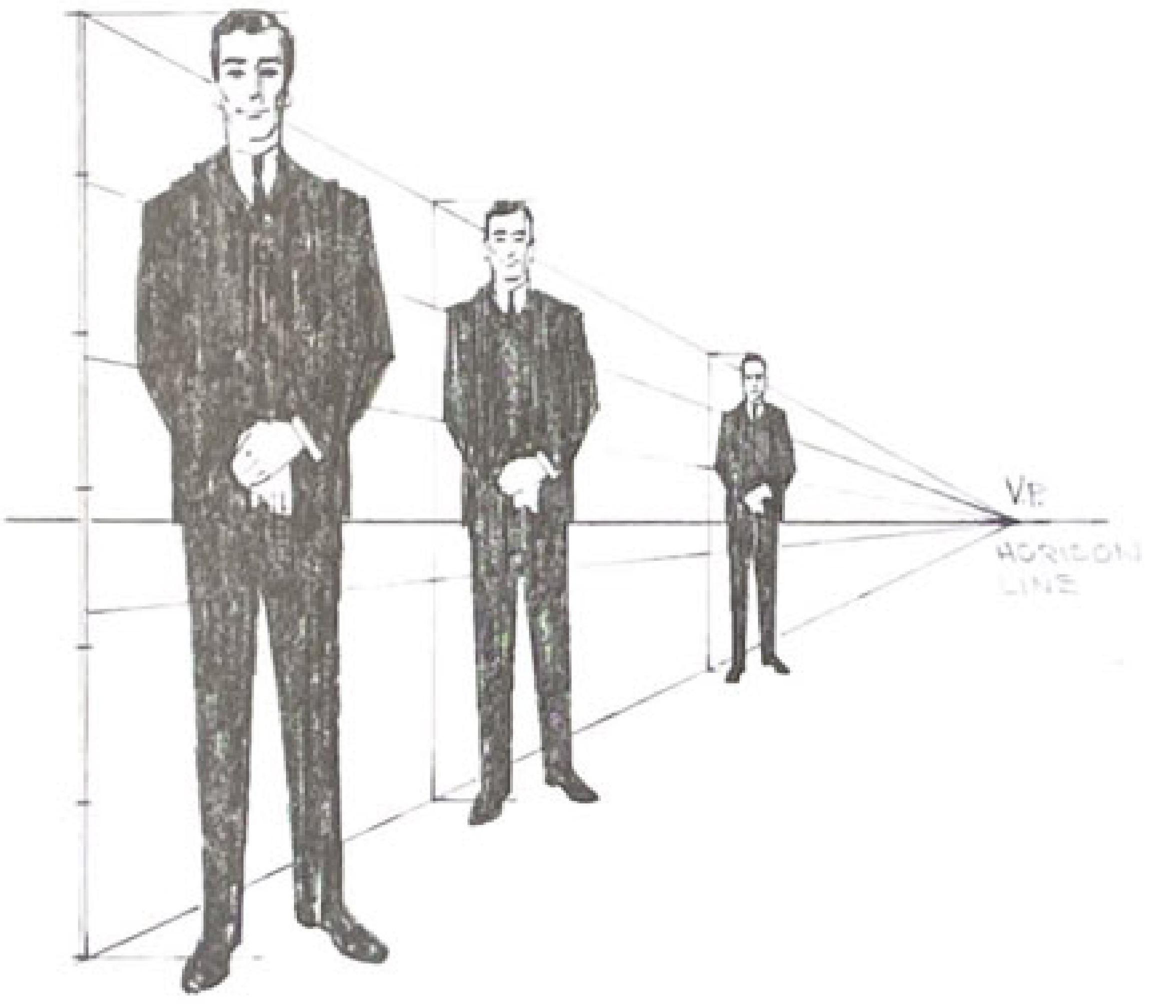
Scaling Objects

Most model airplanes are made to scale. This means they have the same proportions that the "real" airplanes have. The only difference is that the models are smaller. A similar type of scaling is used in perspective drawing. There are many times when you will draw identical objects – one close and one far away. When you do this, however, you must make the distant object smaller than the nearer object to show the space between them. Keeping these objects "in scale," so their proportions remain the same, won't be difficult if you learn to use the scaling stick.

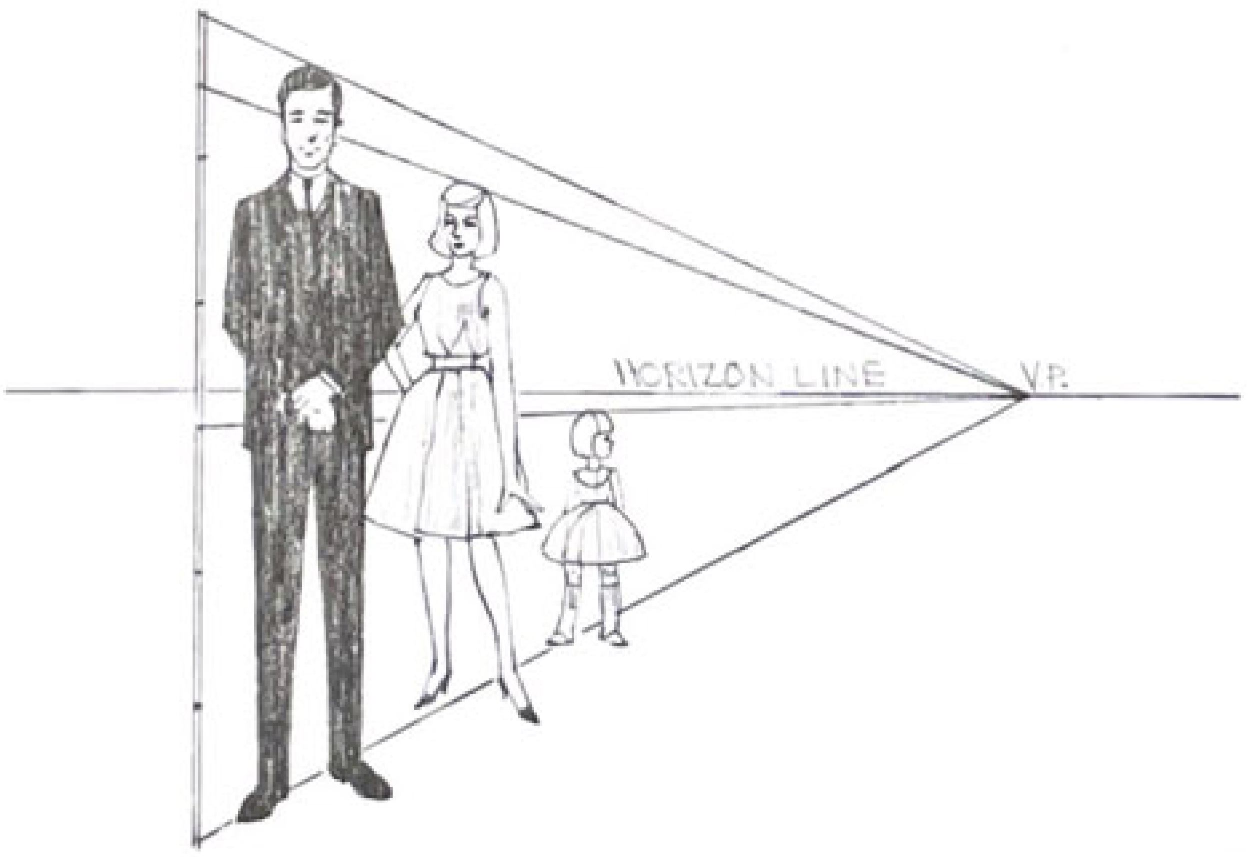
With a scaling stick you can draw any object any distance from you and know that you have made it the proper size. You can also combine objects and know that their size relationship is still accurate. As an example, you can draw a group of soldiers marching down a winding road, or you can combine a single figure ten feet away from you with an overstuffed chair thirty feet away. Once you understand and master the scaling stick you will feel confident that your perspective measurements will satisfy the sharpest of critics.

WHAT TO DO

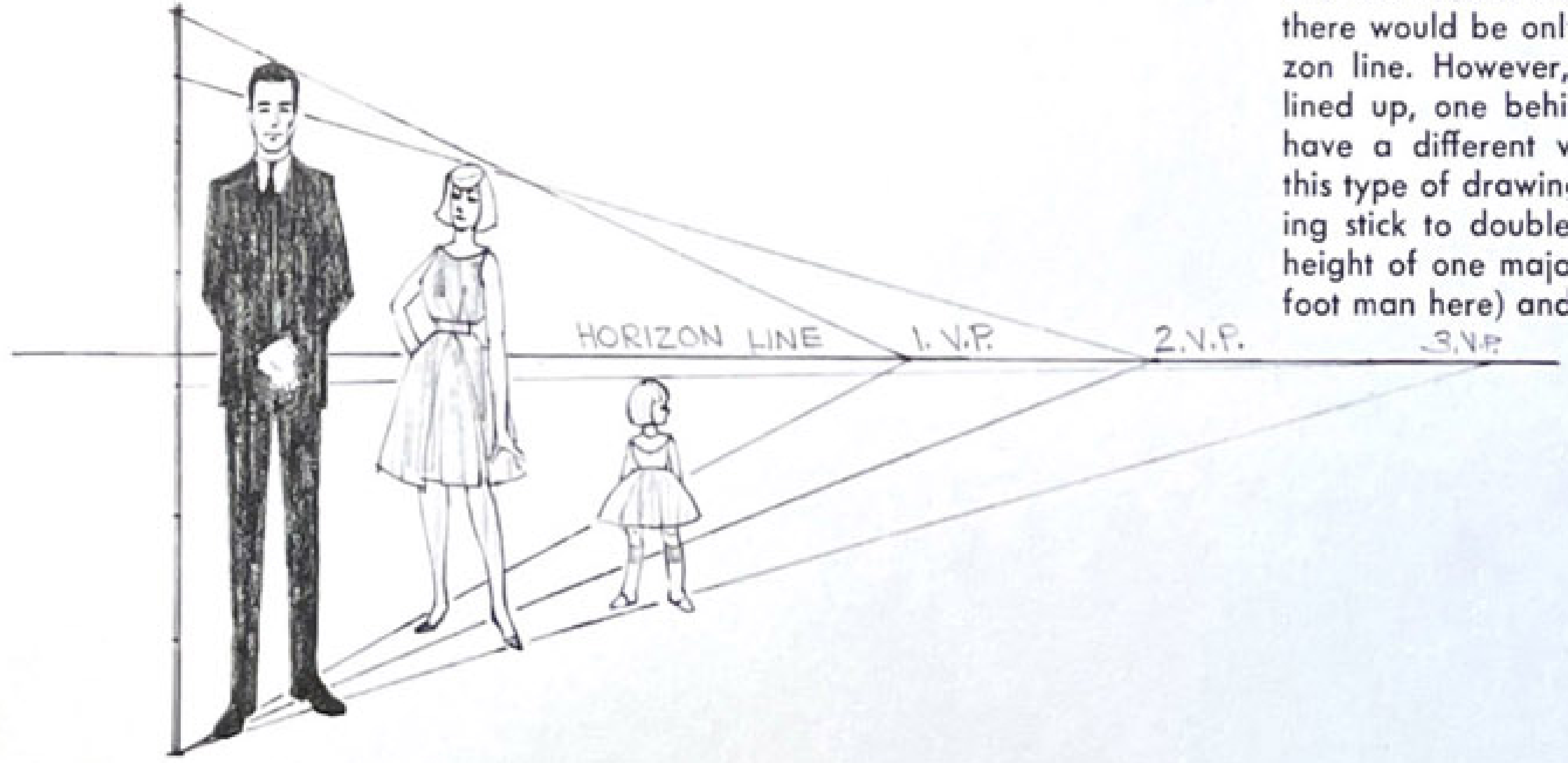
With your ruler, measure the height of a table, the back and seat of a chair, the height and size of a window or picture. Then draw a scaling stick and divide it into 10 equal spaces. Next draw a vanishing point 8 or 9 inches to the right or left of this stick and extend perspective lines from the top and bottom of the stick to the vanishing point. Let each space on the scaling stick represent one foot and with your furniture measurements, try to draw these pieces to scale. Sketch the chair, table, etc., between the scaling stick and the vanishing point.



In this demonstration the scaling stick is divided into six equal spaces to correspond to the six foot height of the man standing directly next to the stick. Horizontal lines were drawn to establish the top of the man's head and the bottom of his feet. Where these meet the scaling stick the artist drew perspective lines to the vanishing point on the horizon line. More perspective guide lines were drawn from the shoulders, right elbow and crotch. These perspective lines indicate the correct height for the second and third man's shoulder, elbow and crotch. With these guide lines, any six foot figure could have been drawn accurately at any point between the first figure and the vanishing point.

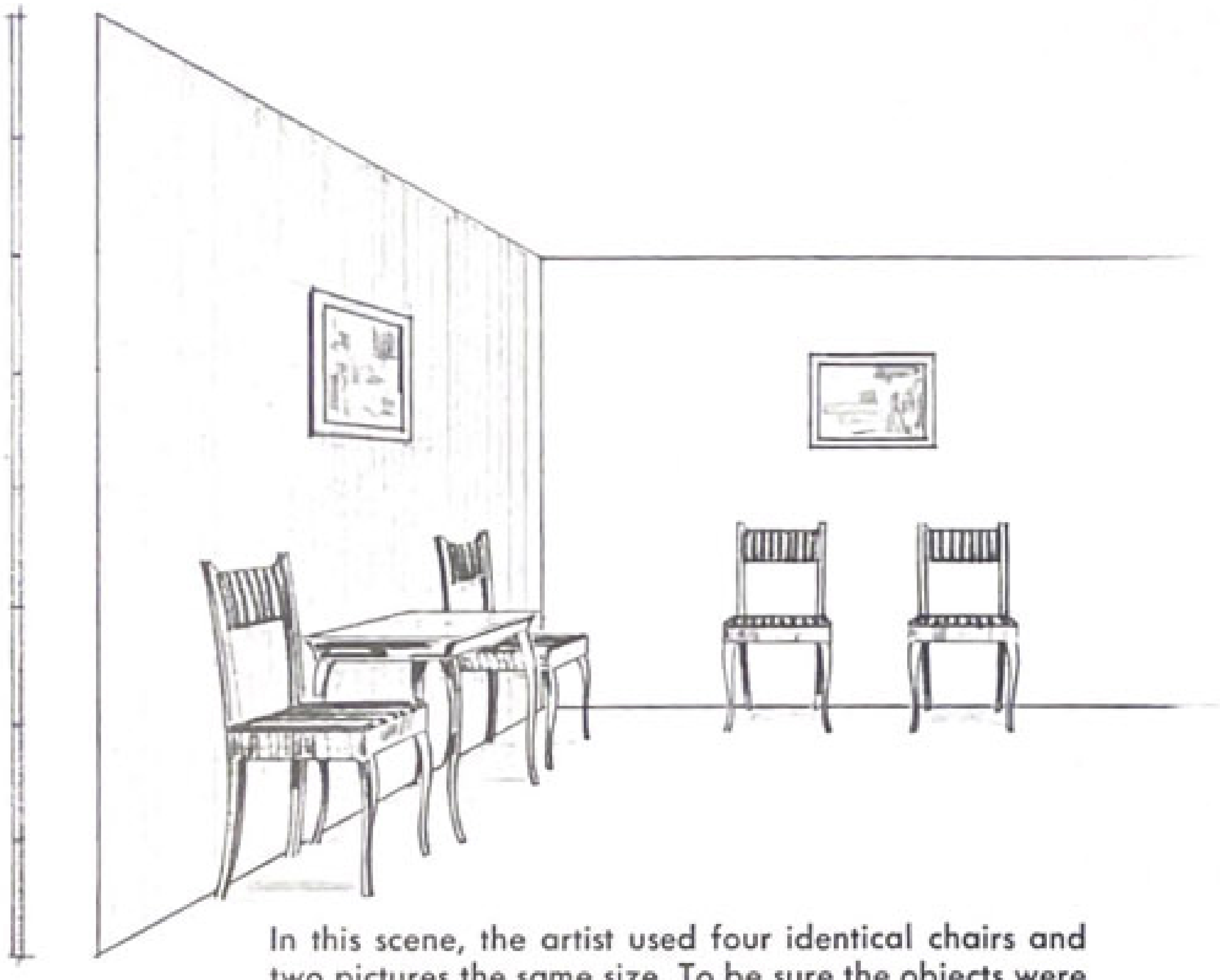


This drawing demonstrates what happens when figures receding into the background are not the same height but are still in a straight line. Here the wife is five and one-half feet tall and the child is three feet tall. The artist first lightly sketched the six foot man and drew a perspective line from the bottom of the scaling stick through the bottom of his feet to the horizon line. This established the vanishing point. Next he drew perspective lines to the vanishing point on the horizon line from points on the scaling stick that correspond to the heights of the people – the man at the six foot mark, the woman at the five and one-half mark and the child at the three foot mark. He then was able to draw the woman and the child accurately behind the man.

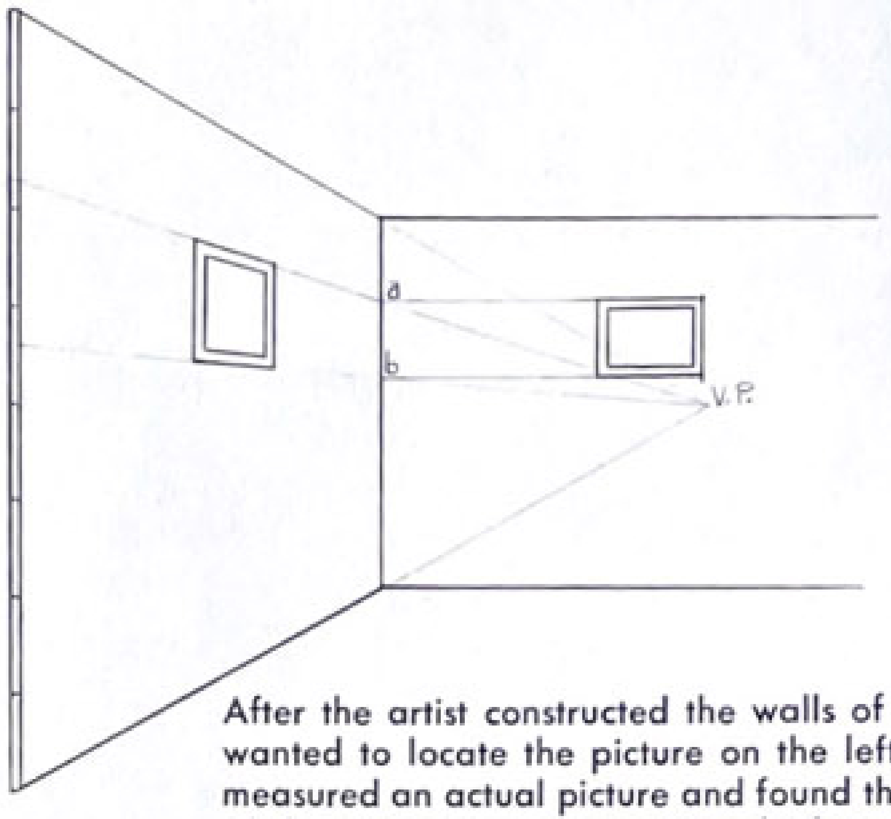


Here is our six foot man again with his wife and little daughter. On the scaling stick notice again that his child is three feet high and his wife measures five and one-half feet. If these figures were in a straight line, there would be only one vanishing point on the horizon line. However, when figures or objects are not lined up, one behind another, notice how each will have a different vanishing point. You should scale this type of drawing by eye first and then use a scaling stick to double check your work. Decide on the height of one major item in your picture (like the six foot man here) and measure everything else by it.

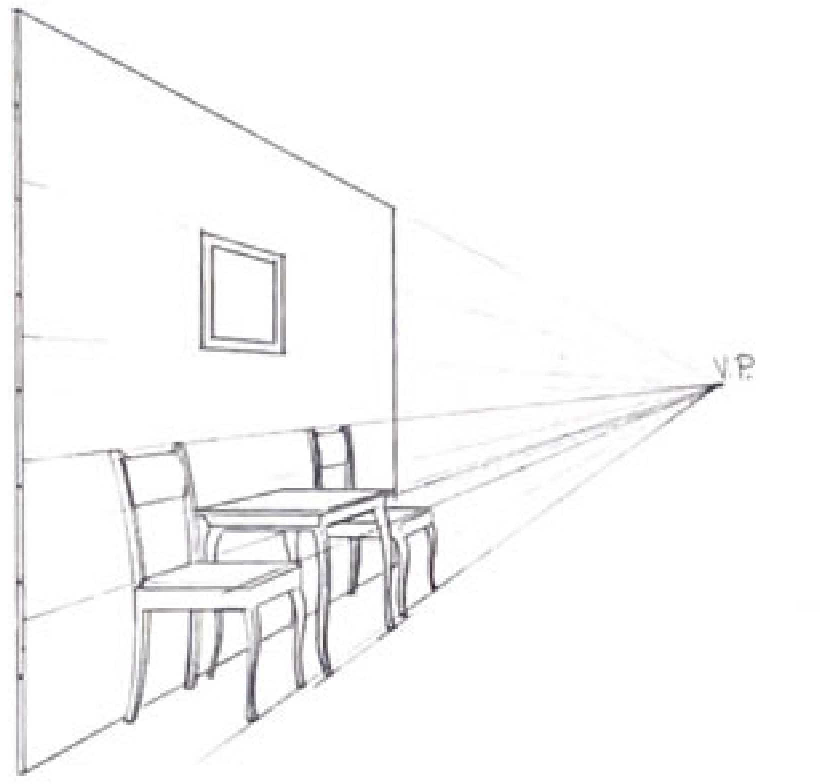
Artwork by George Terp



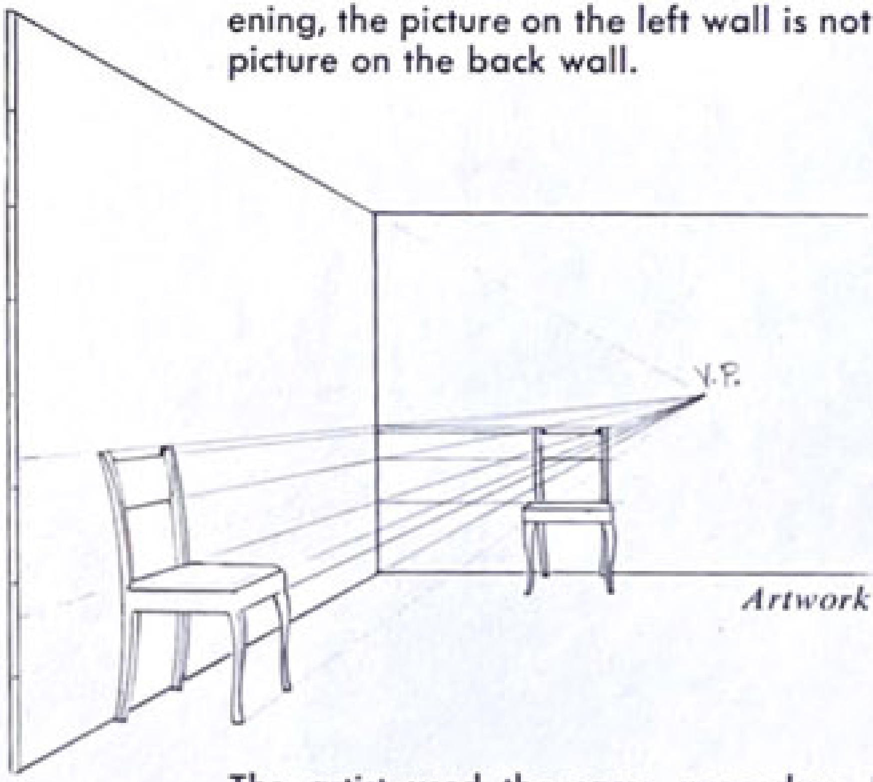
In this scene, the artist used four identical chairs and two pictures the same size. To be sure the objects were in correct scale, the artist used a scaling stick. Such a stick is used to get the proper height of objects as they recede into the background. Let's take a look at the scaling stick to see how it is used. A scaling stick is just a simple drawing of a stick divided into equal spaces. Each space can represent any measurement the artist wishes . . . one inch, two inches, one foot or ten feet . . . depending upon what the artist is drawing. In this drawing, the scaling stick is the same as the end of the left wall. Each of the eight spaces on this particular scale represents one foot because this room had an eight foot ceiling. Now let's follow the specific steps the artist took in drawing this picture.



After the artist constructed the walls of the room, he wanted to locate the picture on the left wall. So, he measured an actual picture and found that the bottom of the picture was approximately four and one half feet above the floor, and that the picture was slightly less than two feet high. He then marked two points on his scale . . . four and one half spaces up from the bottom and slightly less than six and one half spaces up. He then drew lines from each of these points to the vanishing point. As you can see, these lines form the top and bottom of the picture. Using his eye, the artist estimated the width of the picture and the placement of the picture between the front and back edges of the wall. To locate the top and bottom of the picture on the back wall, the artist drew horizontal lines with his T square from the points (a and b) . . . the points at which the above perspective lines crossed the corner line. Again, he used his trained eye to determine the width of the picture because the scaling stick gave him only vertical distances. Notice that the height of the second picture is shorter than that of the first picture because it is farther away from the viewer. Remember . . . objects look smaller as they recede into the background. However, notice that, because of foreshortening, the picture on the left wall is not as wide as the picture on the back wall.



In drawing the closer of the two chairs against the left wall, the artist also wanted to keep the height of the chair in scale to the height of the other objects in the room. So, he measured a real chair and used these dimensions to mark off points on his scaling stick. After some experience estimating the height of chairs, you can get so that you don't actually have to measure with a ruler or tape measure. Notice that the artist then drew perspective lines from his scale through the top of the chair's backrest, the top of the seat, etc. The second chair was easy to scale because it was exactly like the first. He could use the same perspective lines for scaling both chairs. To scale the table, the artist marked a point on the scale the height of the table and extended a perspective line to the vanishing point. As with the pictures, the artist had to estimate the width and depth of the chairs and table because the scaling stick supplied only the proper height. Notice that the second chair, because it is farther from you, is smaller in all of its dimensions. With practice, you will soon be able to scale objects of all different kinds.



Artwork by Jim Deneen

The artist used the same procedure for scaling the chairs "around the corner" that he used for scaling the two pictures hanging on the walls. Perspective lines from the scaling stick located the top of the backrest, the thickness of the crosspiece on the back of the chair, the seat of the chair, etc. These lines all go to the vanishing point. But, where they cross the corner line, the artist drew horizontal lines to locate the same heights on the chairs against the back wall. The horizontal lines are based on the corner of the room because this is how far the chairs are from the viewer. If the chairs were forward from the back wall, you could use a vertical line forward on the left wall from the corner to establish your horizontal lines. If you compare this drawing to the third one, you will see in the third drawing that once the artist estimated the width of the front chair along the left wall, he drew perspective lines to locate the other front legs and the front of the seat. He couldn't use similar lines for the chair against the back wall because the lines of the front legs and the front edge of the seat do not run along the left wall. As a result, he simply used his trained eye to observe and put on paper what he saw. As you practice, you will soon be able to make accurate guesses of the kind he did. Notice how much smaller the chair against the back wall appears, and yet how much farther the front legs are apart, when compared to the chair against the left wall. Perspective drawing of this type becomes easier as you learn to know what to look for, and what to do.

Multiple Vanishing Point

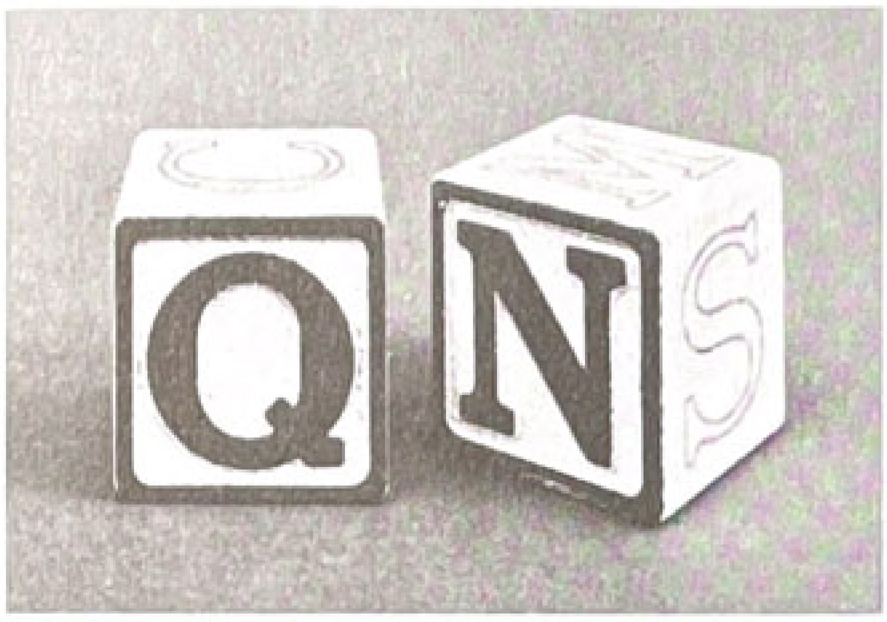
One and two point interiors are necessary to understand first, but as you continue drawing, you will realize that even two vanishing points are not enough for *every* interior.

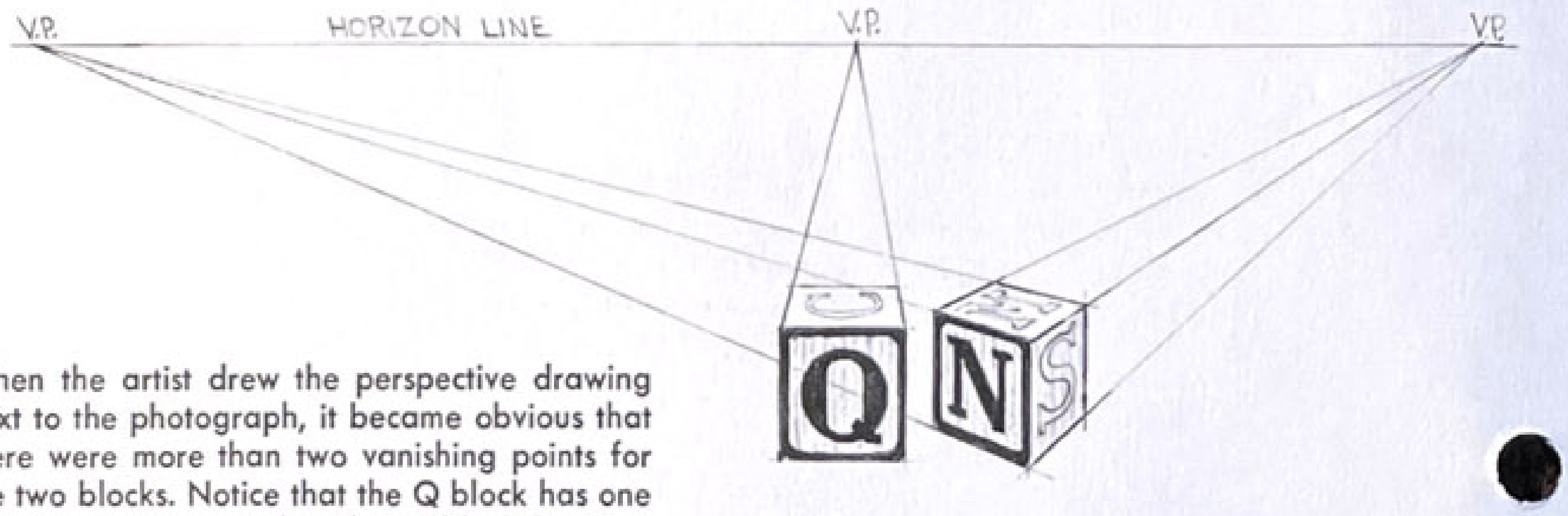
In order to have either one or two vanishing points, all of the objects in the room must be parallel with the walls. Most of us don't have all of our furniture backed against the walls. Instead, we usually put some of the furniture at different angles. By putting furniture at different angles to the wall, we make a room more interesting. But, these new angles also introduce new problems to the artist. For, every time an object in an interior is not parallel to the walls, it has a different vanishing point than the walls have.

If you examine the drawings and photos on these pages, you will see how useful your knowledge of multiple vanishing points will be. Whether you draw interior scenes or outdoor scenes, you should know how to use multiple vanishing points. After you thoroughly study the material about multiple vanishing points, try drawing the scene in this section. Take special note of how the artist was able to "locate" that "extra" vanishing point.

WHAT TO DO

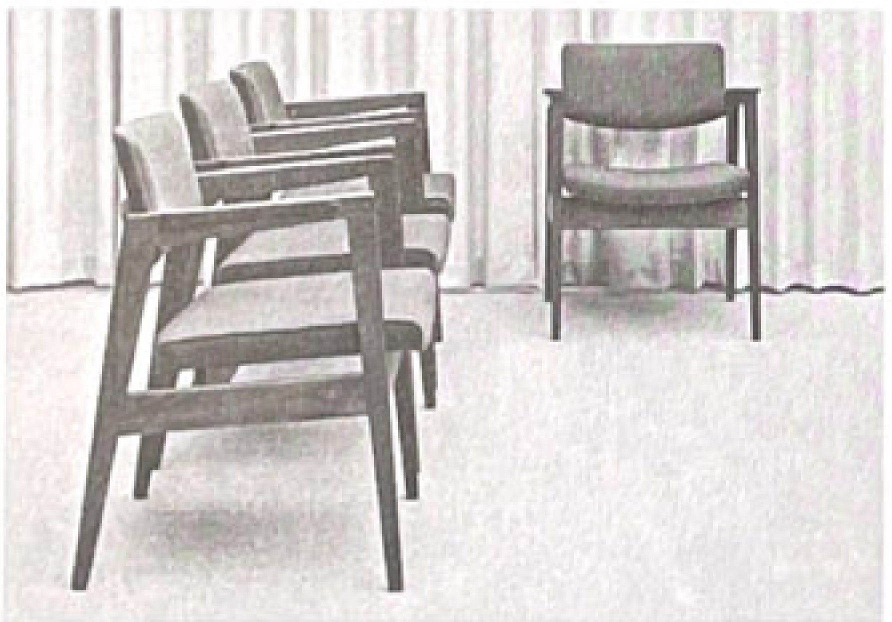
Go back to the practice sketch you did for the one point interior and tape or tack a sheet of clean tracing paper over it. Now, follow the step-by-step instructions of this lesson to add a piece of furniture using two more vanishing points. All three points must be on the horizon line.

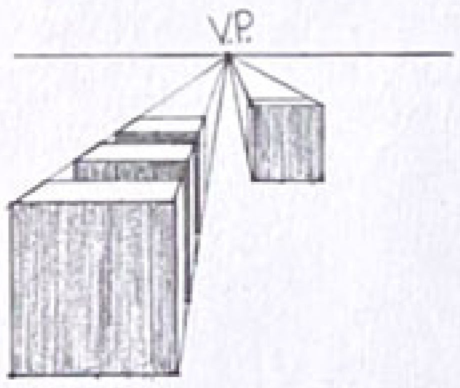




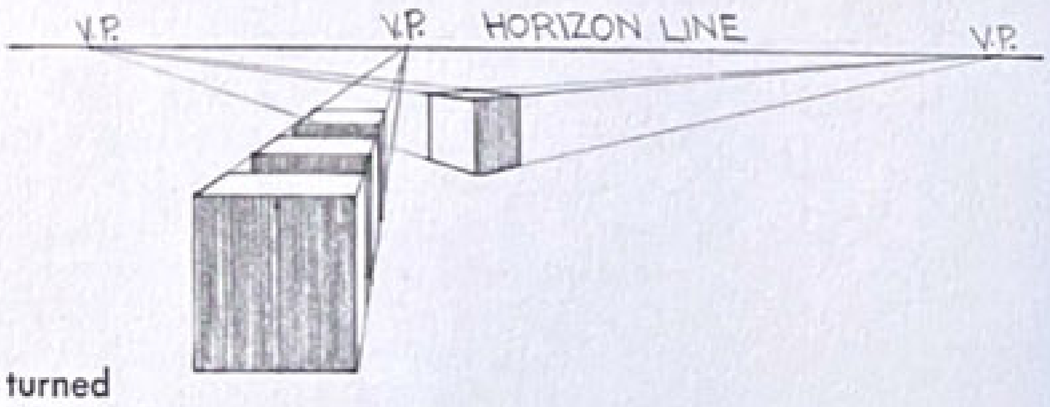
When the artist drew the perspective drawing next to the photograph, it became obvious that there were more than two vanishing points for the two blocks. Notice that the Q block has one vanishing point and that the N block has two completely different vanishing points. When you draw more than one object you will often have to use multiple vanishing points — if the objects are not parallel with each other.

Photographs by Bob Blanch

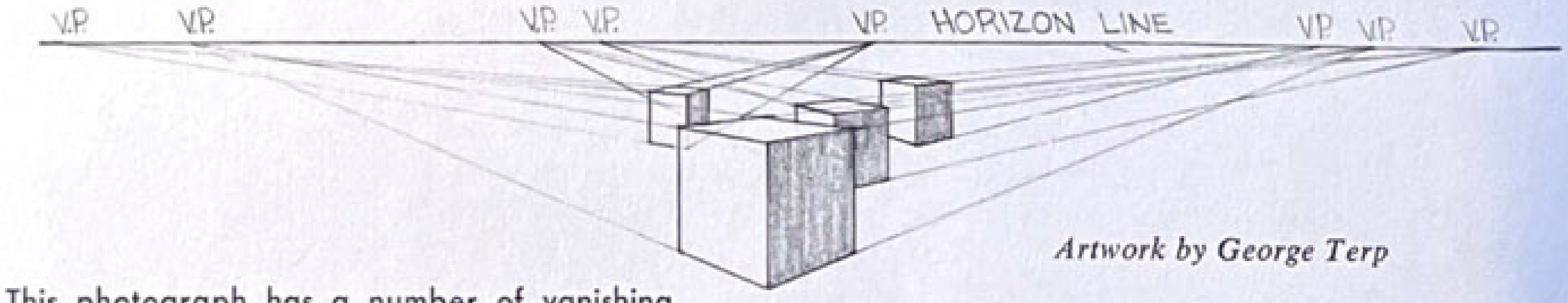




These chairs all have the same vanishing point. An artist sketched the basic forms involved in the four chairs to show how the perspective lines all meet at one point. These chairs all have the same vanishing point because they are all parallel.

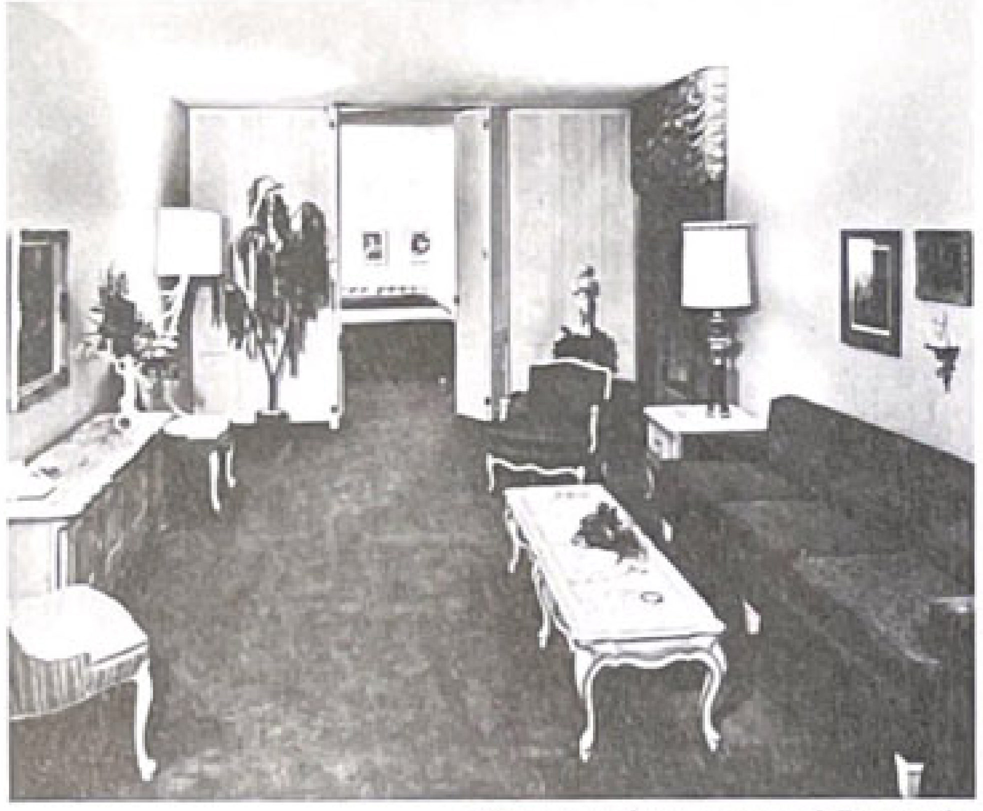


In this photograph one of the chairs was turned at an angle to the other chairs. This chair has two vanishing points, both different from the vanishing point of the line of chairs. Notice how the perspective guide lines shown in the sketch indicate the position of the vanishing points on the horizon line.



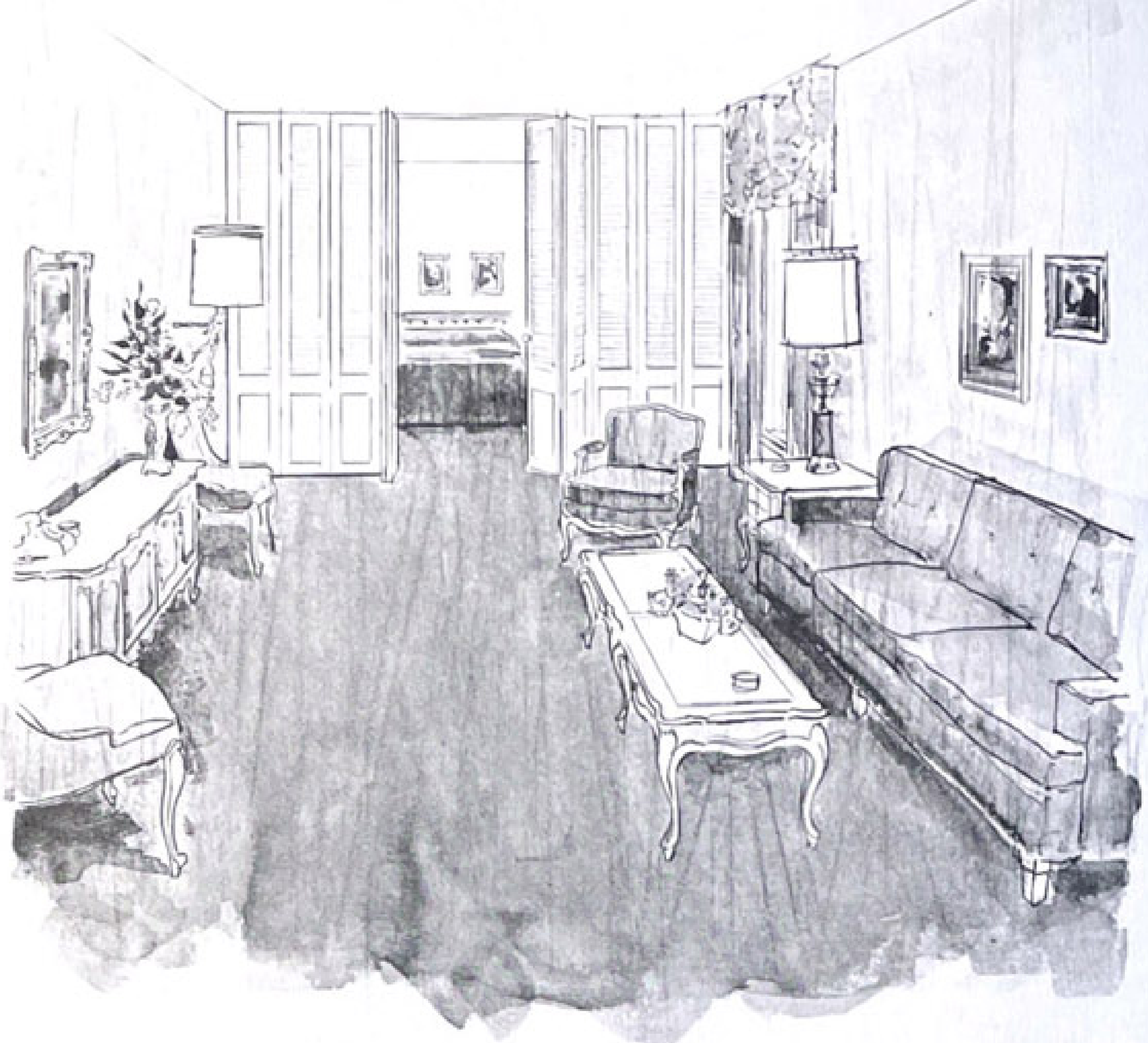
Artwork by George Terp

This photograph has a number of vanishing points because the chairs are all at different angles from each other. If you study the perspective lines in the sketch you will be able to see how many vanishing points there really are. Just think of each chair separately and you will have no trouble understanding multiple vanishing points.



Photograph courtesy of Dayton's

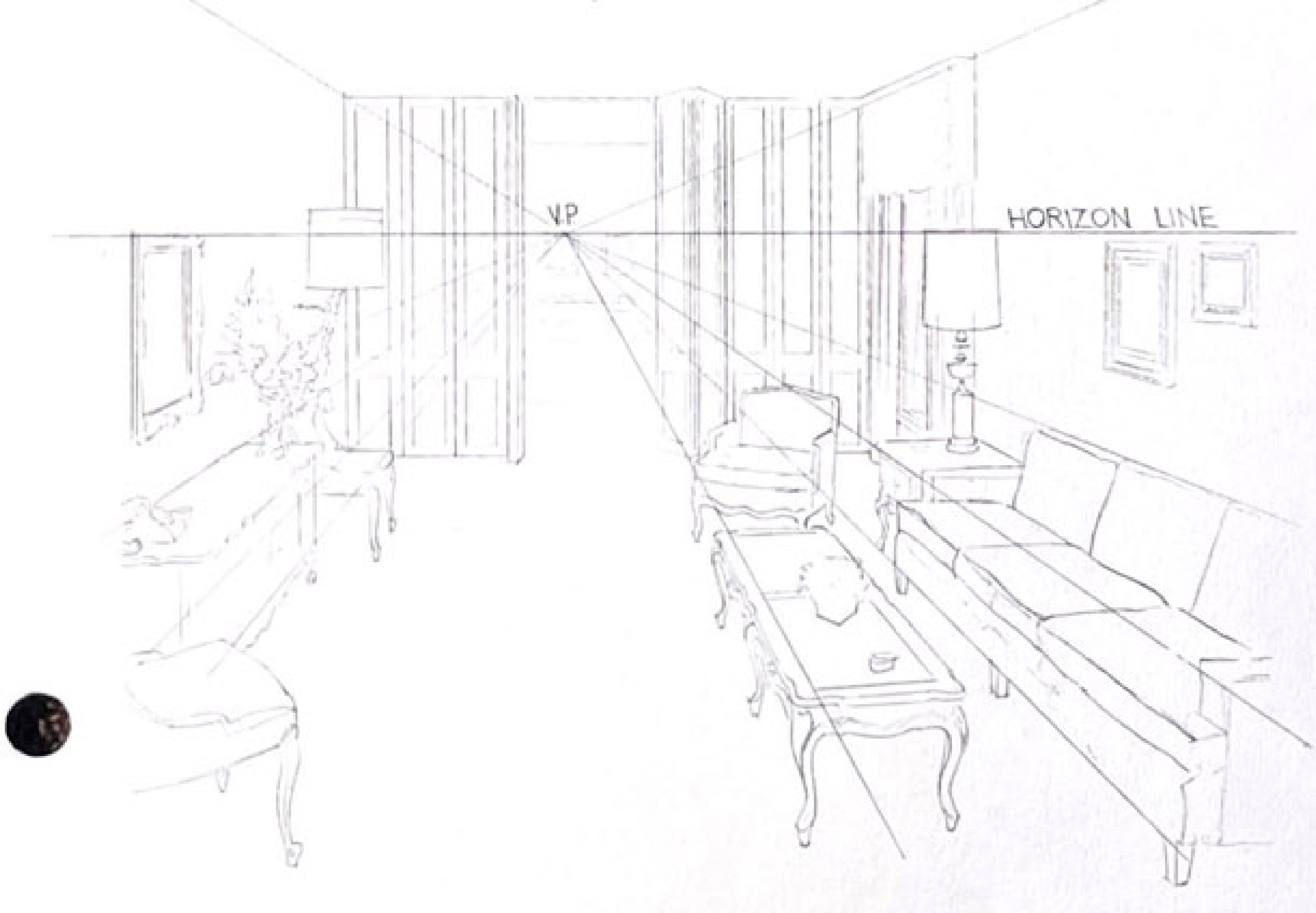
Study the photograph of this room. Notice that all of the furniture is parallel with the walls – except the chair in the corner of the room. This chair is at an angle to the walls, and consequently, it does not have the vanishing point that the other furniture and walls have.



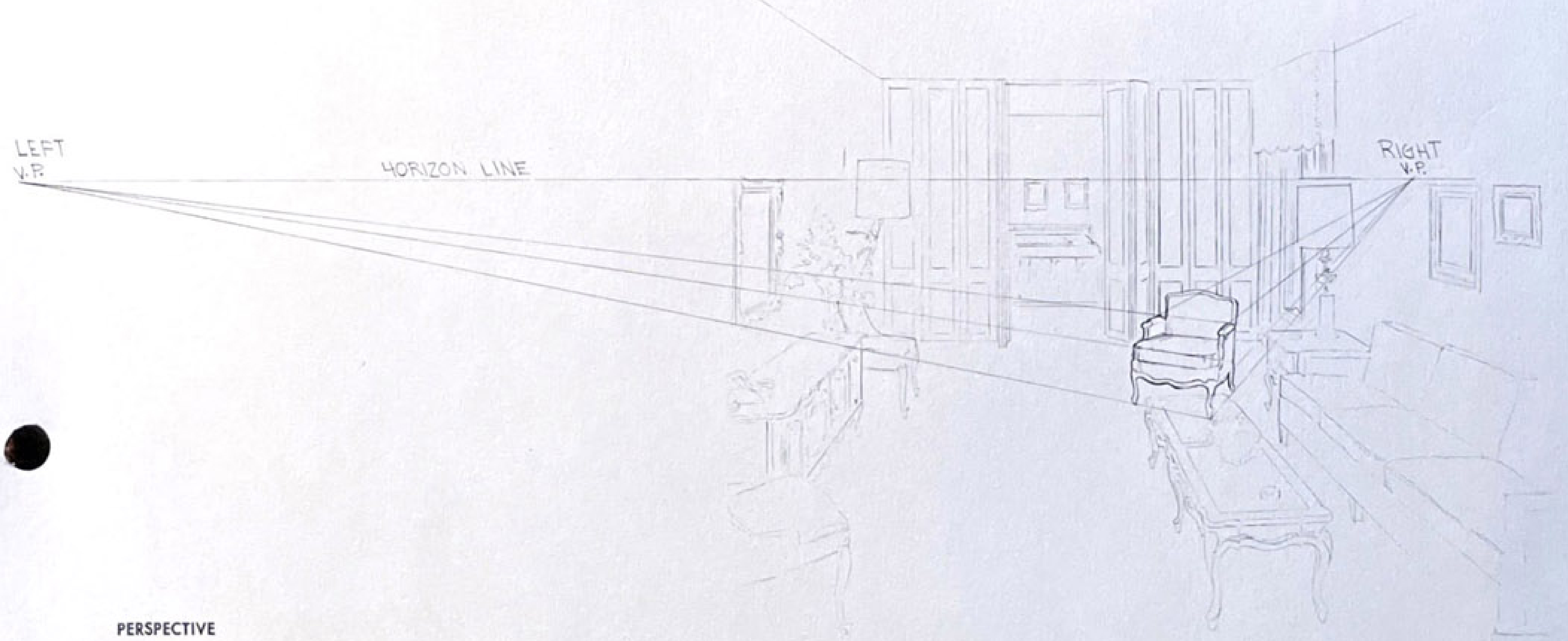
Artwork by Jim Deneen

Study this drawing. It's the finished illustration drawn from the photo. The artist was able to draw this accurately because he knew how to handle multiple vanishing points. The drawing was rendered in transparent wash and pencil. Even with a minimum of detail in rendering, the drawing has texture and interest.

First the artist sketched the interior of the room. Then he found the vanishing point by extending the lines of the ceiling until they met. He drew the eye-level line (horizon line) through this vanishing point. When he corrected the lines of the furniture and walls, he ran the perspective guide lines to the vanishing point. After the artist checked the perspective lines he used his T-square and triangle to improve the horizontal and vertical lines of the objects.



Next the artist checked the accuracy of the chair drawn in two point perspective. First he found the right vanishing point by using his ruler to draw a guide line along the bottoms of the two legs (right side) up to the horizon line. Where the line met the horizon line, the artist found the right vanishing point. He also drew guide lines along the arms of the chair and the bottom to this vanishing point. In order to find the left vanishing point the artist drew a guide line along the bottoms of the two front legs. The left vanishing point was located by this perspective guide line as it met the horizon line. Notice how the artist used this vanishing point to check the seat and the backs of the arms on the chair.



The Vanishing Trace

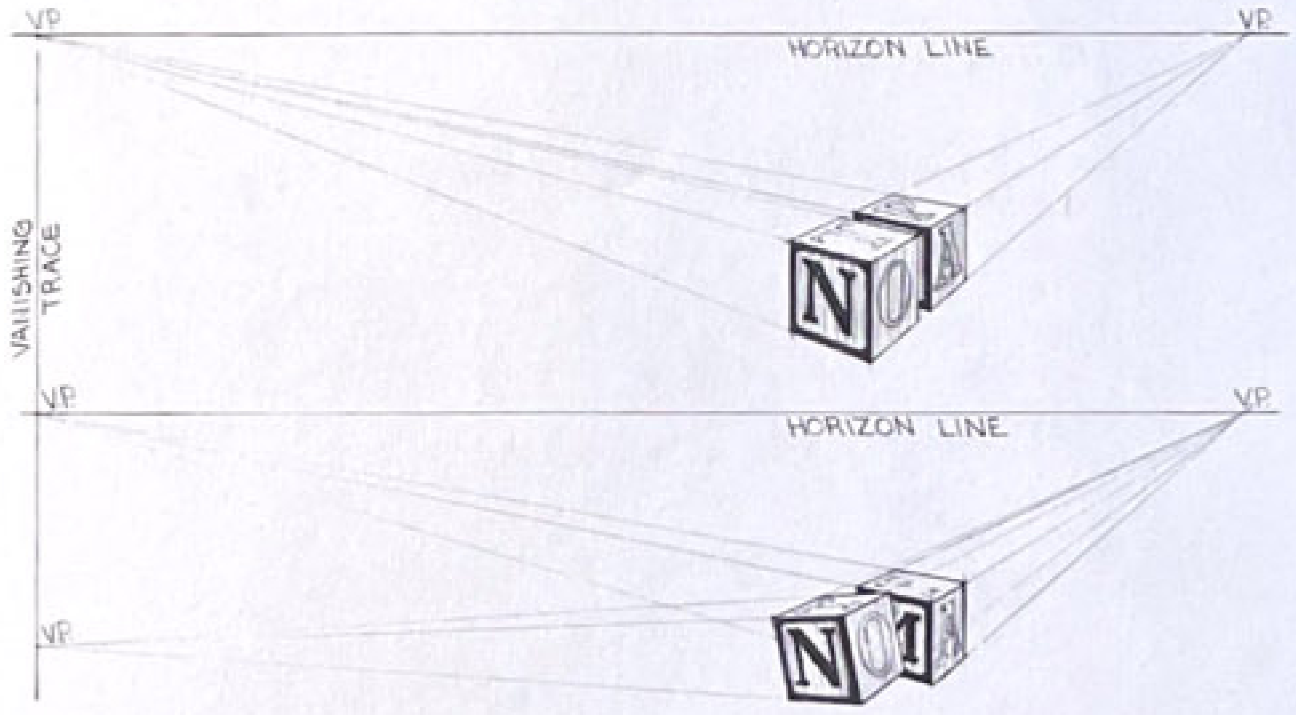
The objects you have been drawing so far have all been resting on flat ground. And because these objects have all been parallel to the ground plane, their vanishing points were all on the horizon line.

If, however, an object is not on flat ground – if it is on an incline or hillside – you'll need vanishing points that are not on the horizon line! A perfect example of this would be the slanting sides of a ramp. These sides are on an angle to the ground plane and, if they were extended, their vanishing point would be up in the sky above the horizon line. Now you know that vanishing points always have to meet on a horizon line and so for these points, you draw a new line that is perpendicular to the horizon. This line is called the Vanishing Trace. The vanishing trace line is always drawn through one of the vanishing points on the horizon line. Where the vanishing trace and horizon line cross, they form a 90° angle.

When drawing the angle of a slanted roof on a house, or the hand rail on a stair way, you also need to use a vanishing trace line. It's really an easy subject to master. With the drawings and demonstrations on these pages you will "pick it up with ease." As you study, just keep in mind that the trace line is a first cousin to the horizon line, and a very important member of the perspective family.

WHAT TO DO

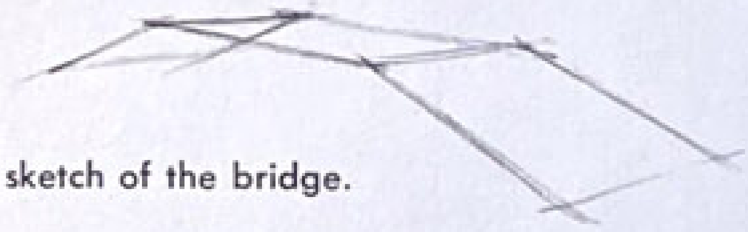
Drawing the angles on the roof of a house isn't a mystery if you know how to use the trace. Why not make a sketch of your neighbor's house and then, with it as a guide, develop a corrected perspective drawing. This will give you a chance to test your knowledge of using a trace.



In the first sketch, both of the blocks are on the same ground plane. When the artist drew these his perspective lines all went to the horizon line. In the second (lower) sketch however, the blocks are not both on the same ground plane . . . one is tilted. To draw the perspective lines for this tilted box, the artist had to use a vanishing trace. Note how this trace line goes through the left vanishing point on the horizon line.

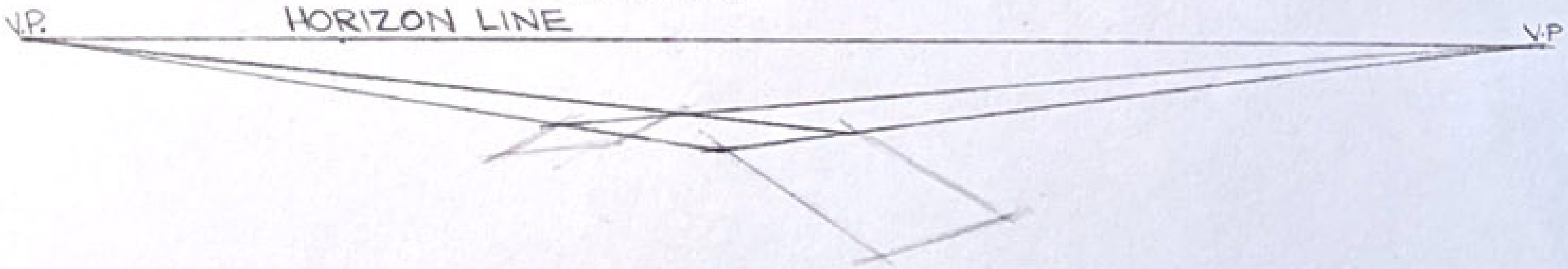
Artwork by Jim Deneen

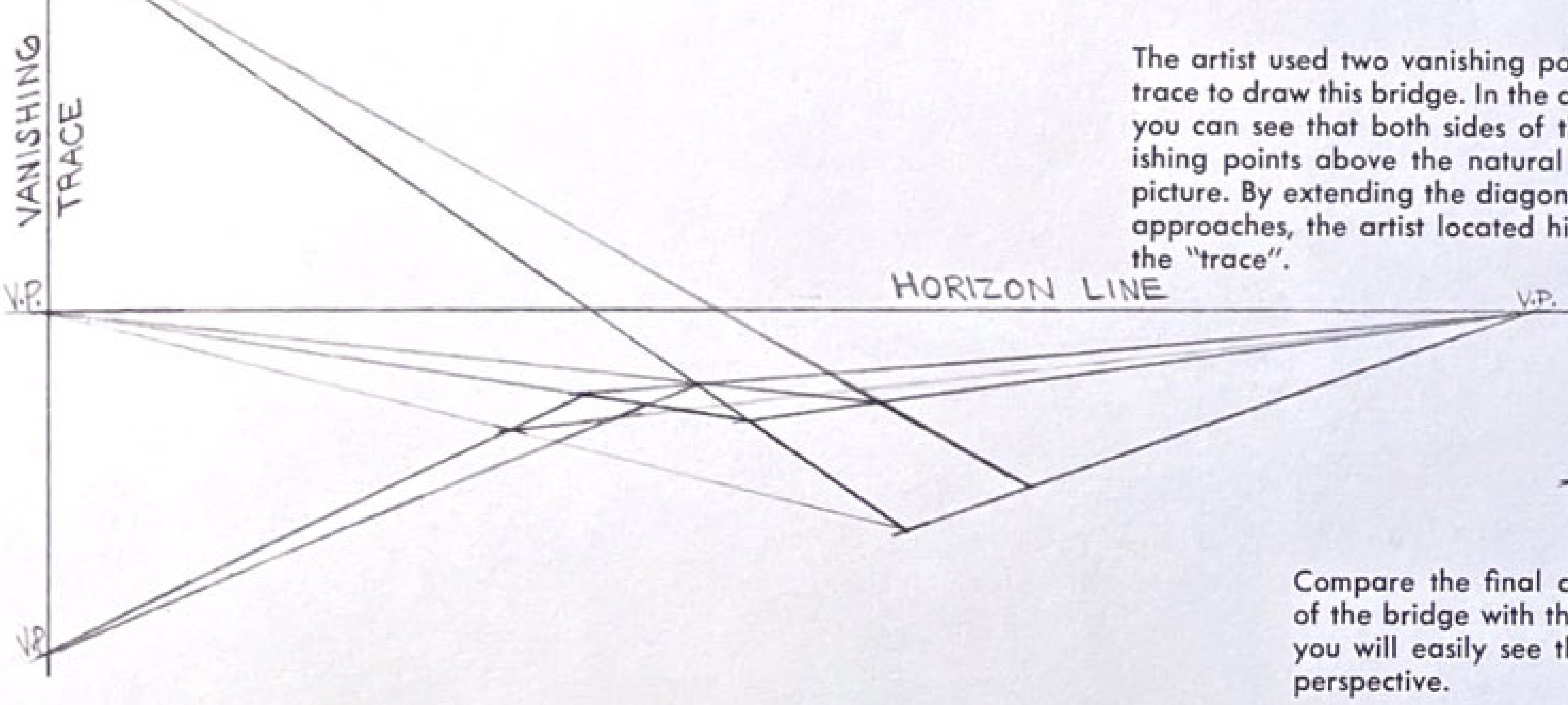
The artist rendered the bridge you see in this lovely country scene by using four vanishing points to correct his original rough sketch.



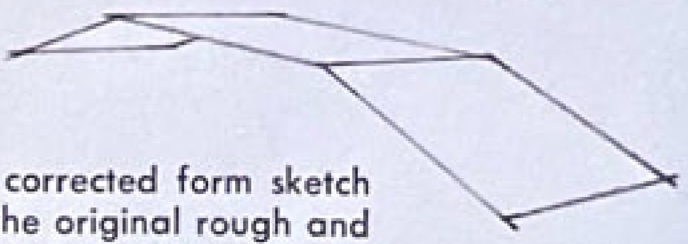
First he did a rough form sketch of the bridge.

Then he extended the lines of the horizontal surface to establish his left and right vanishing points and his horizon line.

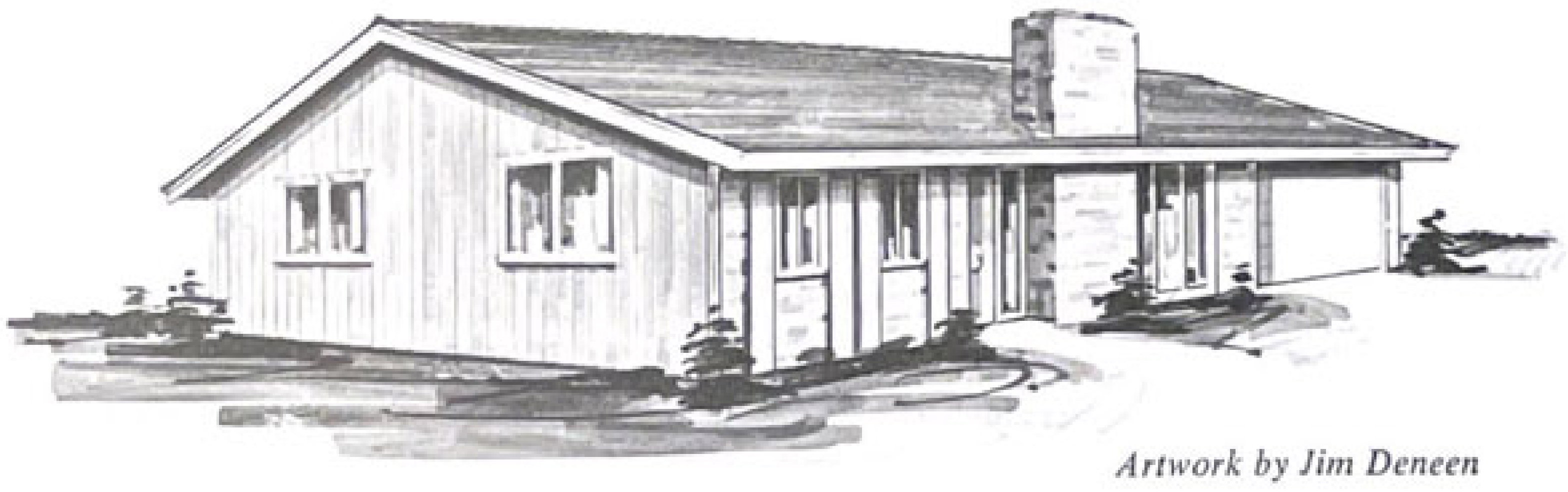




The artist used two vanishing points on the vanishing trace to draw this bridge. In the diagram of the bridge you can see that both sides of the incline go to vanishing points above the natural horizon line for this picture. By extending the diagonal lines of the bridge approaches, the artist located his vanishing points on the "trace".



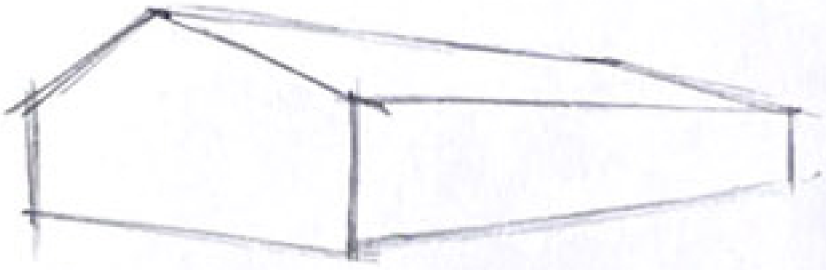
Compare the final corrected form sketch of the bridge with the original rough and you will easily see the need for accurate perspective.

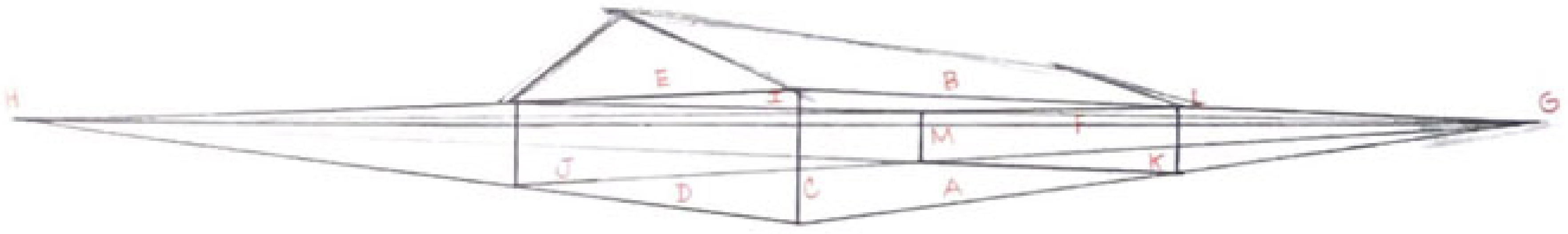


Artwork by Jim Deneen

This drawing was done in pencil, transparent wash and ink. As you study the step-by-step development the artist used when he drew the picture, refer back to this finished drawing so you can be sure why he proceeded the way he did.

First the artist started by sketching (freehand) the basic shape of the house. He didn't bother adding the details at this point. He was only interested in creating the correct overall shape or form which he will erase as he constructs the house using perspective.

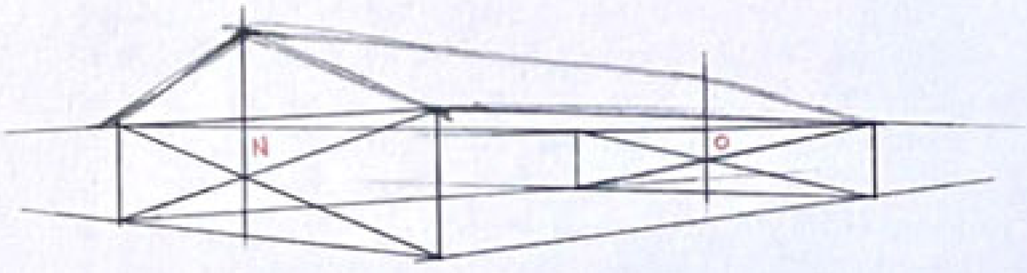


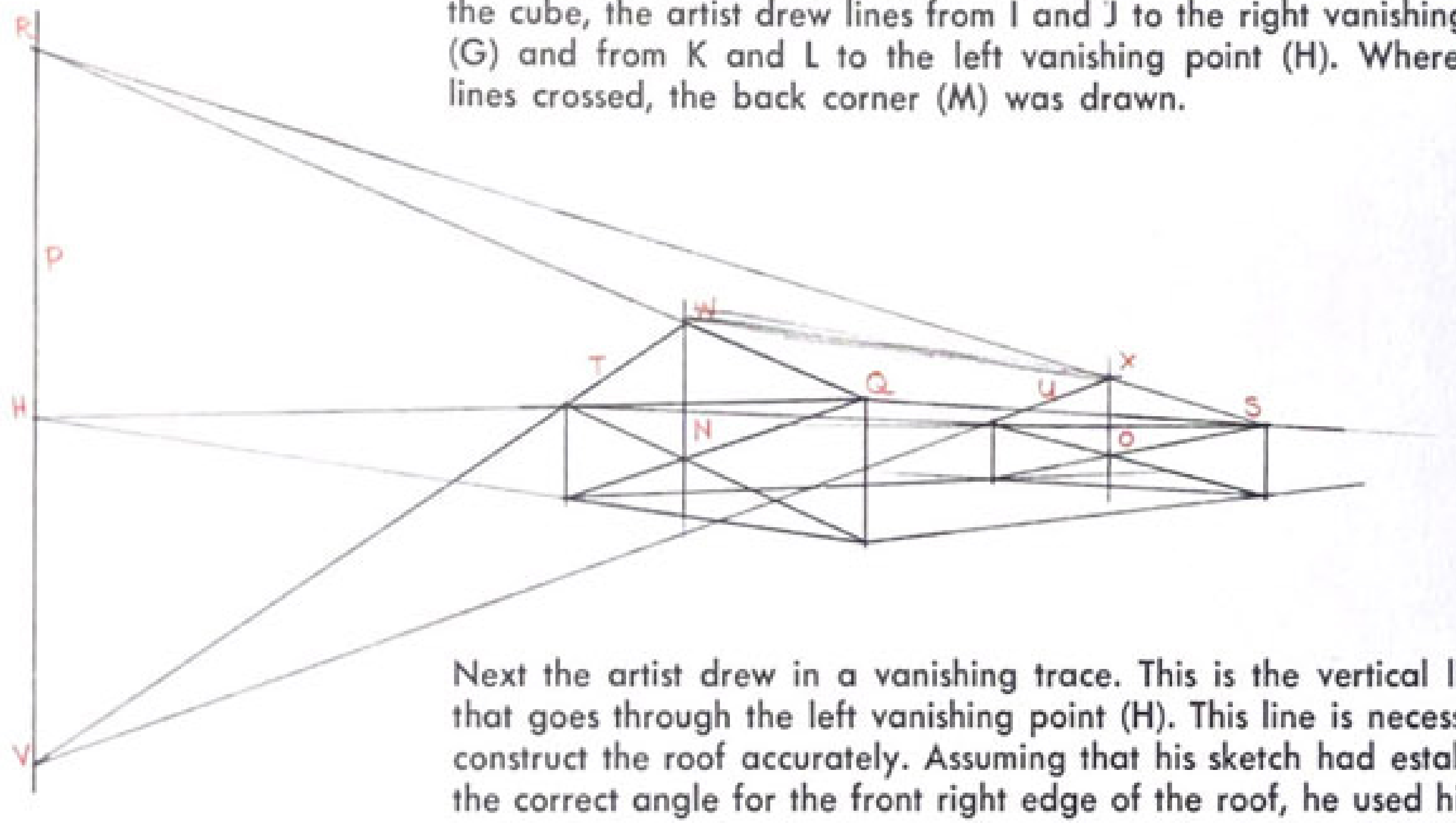


The artist constructed the lines of the right side (A and B), with his ruler and extended them to the point where they met vanishing point (G). Then he put in the horizon line (F) by using his T-square and drawing a line through this vanishing point. Next he drew the corner line (C) using his T-square and triangle. The top of the end wall was established by extending the top line (E) to the horizon line. Where this line met the horizon line, the artist found the left vanishing point (H). He then extended the lower line (D) to the left vanishing point (H).

In order to complete the house correctly it was necessary to construct the inside which is not visible in the final drawing. Just as in constructing the cube, the artist drew lines from I and J to the right vanishing point (G) and from K and L to the left vanishing point (H). Where these lines crossed, the back corner (M) was drawn.

The artist located the centers of the end walls before he could add the roof. He drew two diagonal lines from corner to corner on both walls to find the exact centers. After he found the centers of the walls, he added a vertical line that went through each of these center points (N and O).

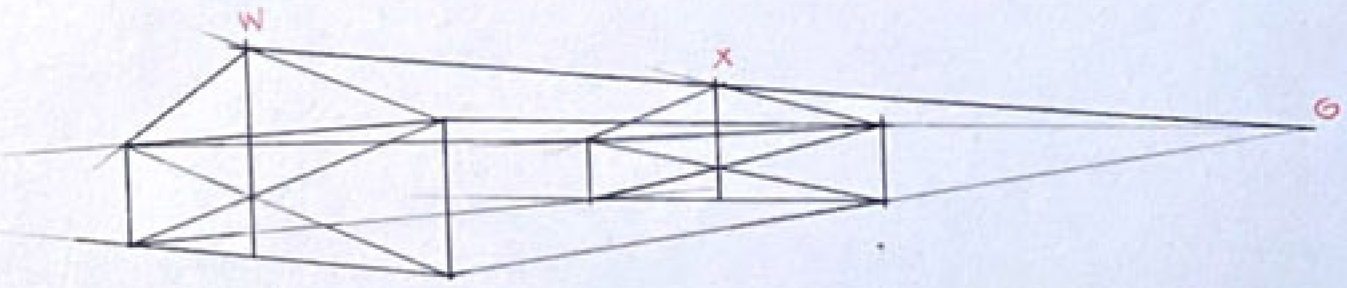


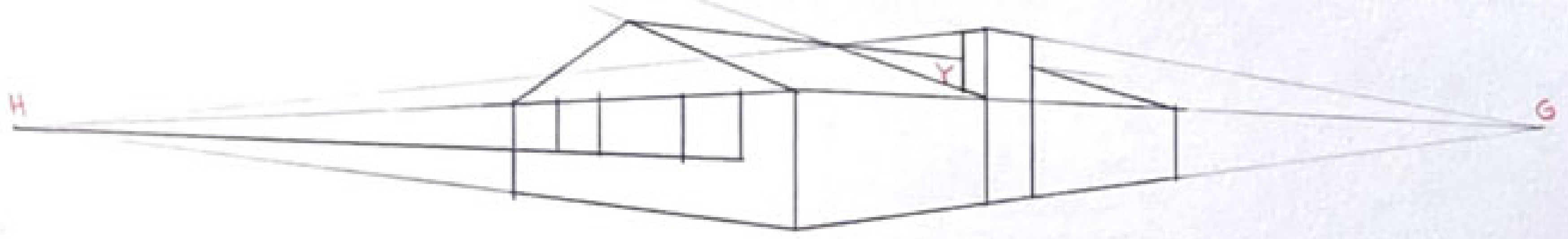


Next the artist drew in a vanishing trace. This is the vertical line (P) that goes through the left vanishing point (H). This line is necessary to construct the roof accurately. Assuming that his sketch had established the correct angle for the front right edge of the roof, he used his ruler to draw a line from the upper right corner of the front wall (Q), along this front edge of the roof and up to the vanishing trace at (R). Then the artist drew the slope of the roof on the back wall by constructing a line from (S) that meets the other line at (R) on the vanishing trace to form a new vanishing point. To finish the roof, the artist drew a line (T) from the point at which the line QR crosses the center line (N) at the front peak (W), down through the left hand corner of the wall to the vanishing trace at (V).

Next he drew a line (U) from point (X) at which the line from S to R crosses the center of the back wall, through the upper left corner of that wall down to point V on the vanishing trace.

In the next step the artist drew a line (using his ruler again) from the front peak of the roof (W) to the vanishing point on the right side (G). Notice that this line also touches the upper tip of the roof on the back wall (X).





Here the artist added the windows and the chimney. Follow the perspective lines of the windows and notice how they go to the left vanishing point (H). The left side of the chimney top also goes to the left vanishing point and the right side of the chimney top goes to the right vanishing point (G). The slanted line (Y) indicating where the roof joins the chimney goes to the upper vanishing point on the vanishing trace. The artist finished drawing the rest of the details in the same way he added these.

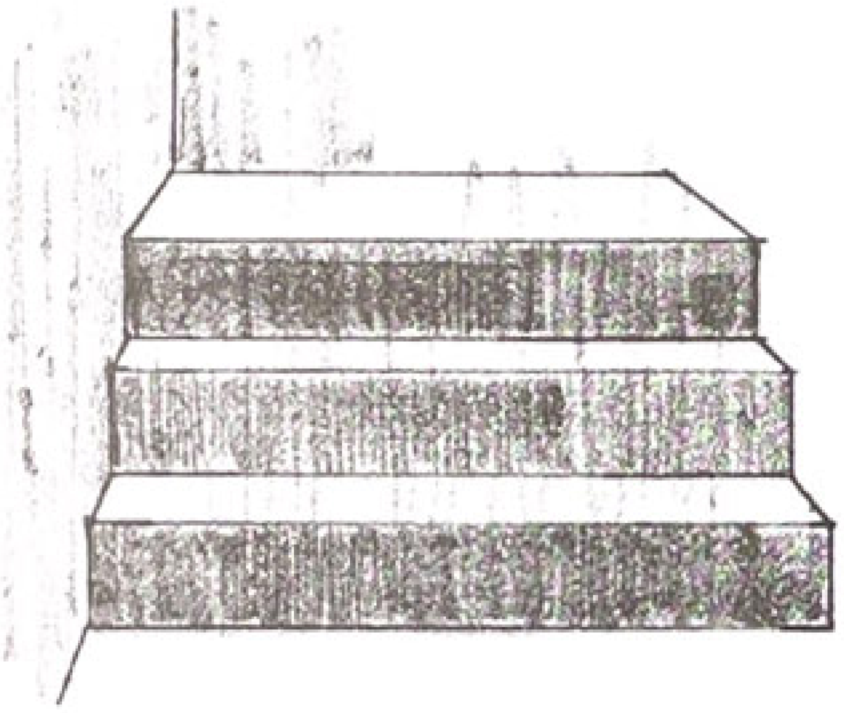
Drawing Stairs

How many hundreds of stairs have you climbed in your life time? If your experience in childhood were like most, you tried climbing your first stairs shortly after you learned to walk. And, you've been going up and down ever since.

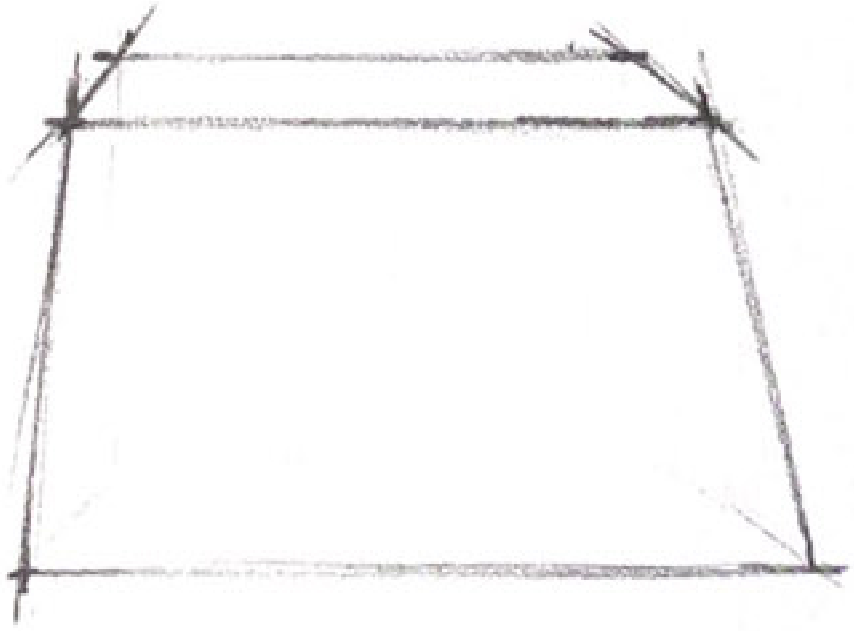
But, from now on, every time you climb or descend a flight of stairs, you will think of vanishing points, horizon lines and the vanishing trace. This is the day you are going to draw your first flight of stairs in perspective. And it's just as important in your advancement as an artist as the day you first felt a stair tread under your baby feet. This experience will be less painful, too! Carefully arranged diagrams and drawings will show you how to measure the risers and treads, how to get the vanishing point for the stair railing, and all the necessary instruction for this type of perspective drawing.

WHAT TO DO

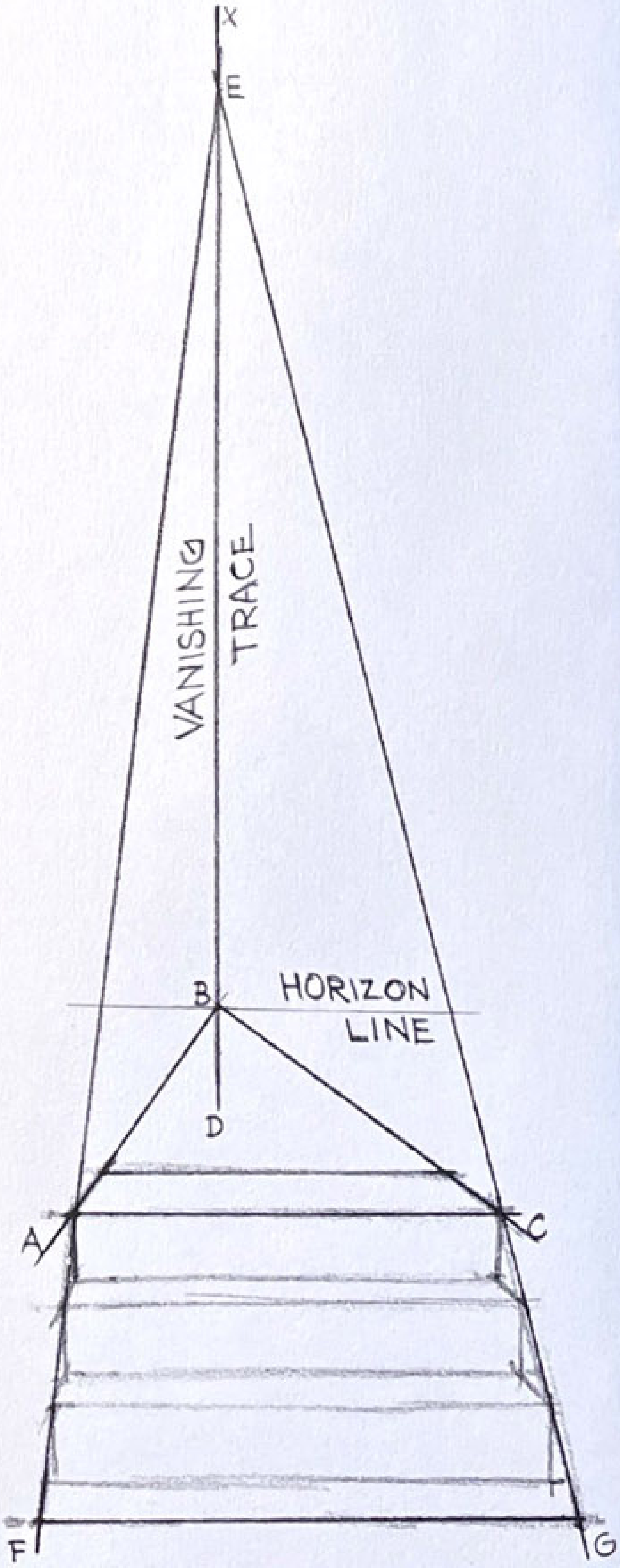
Try drawing a staircase using the principles taught in this section. Go through a magazine until you find a large photo of some stairs. Using this, and the instructions in your text book, see if you can make a careful perspective drawing. Better yet, if you have a flight of stairs in your own home, work from them.



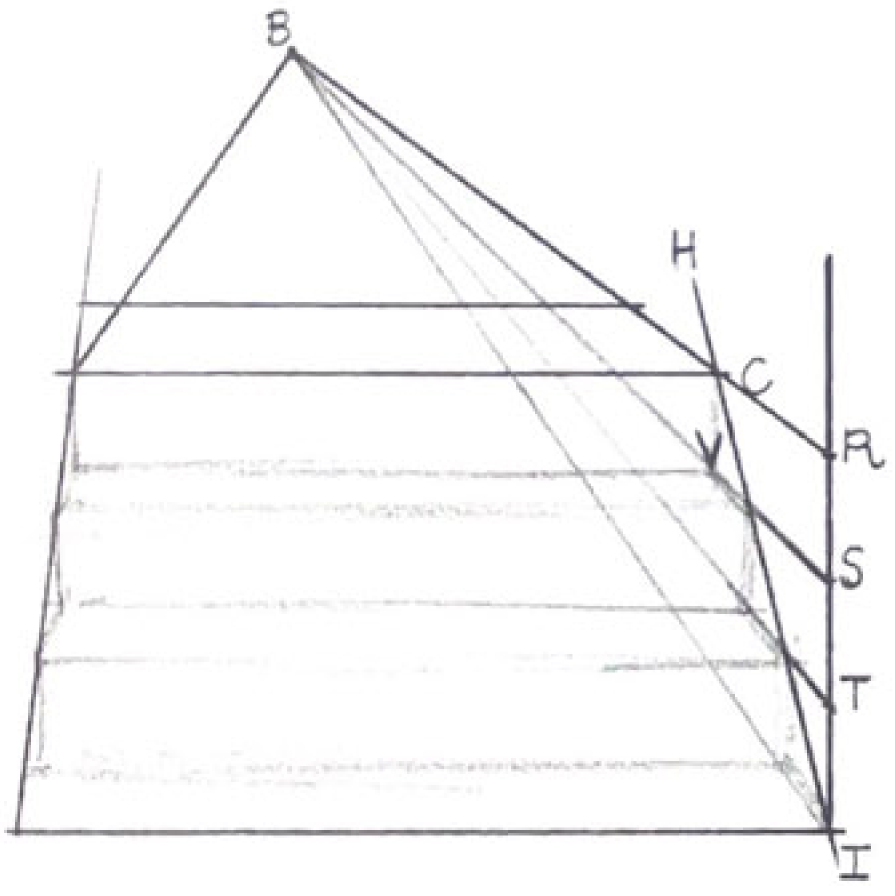
This one point staircase not only shows a good understanding of rendering, but an excellent knowledge of perspective drawing. The artist started his drawing free hand but used the mechanical aids and rules of perspective to check and correct his sketch. Then with the drawing corrected, he transferred it to good paper and made the finished rendering with pencils and a felt tip pen.



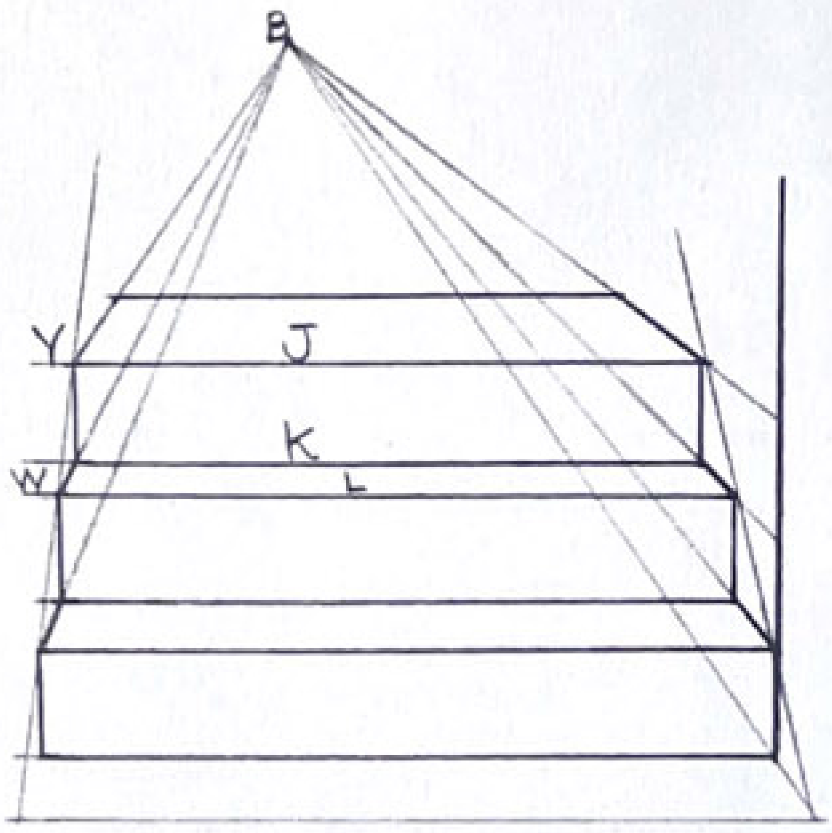
The artist started by sketching the stairs as if they were a solid ramp. This helped him "feel" the three dimensional space of this structure. Later he cut into this solid to show the risers and treads.



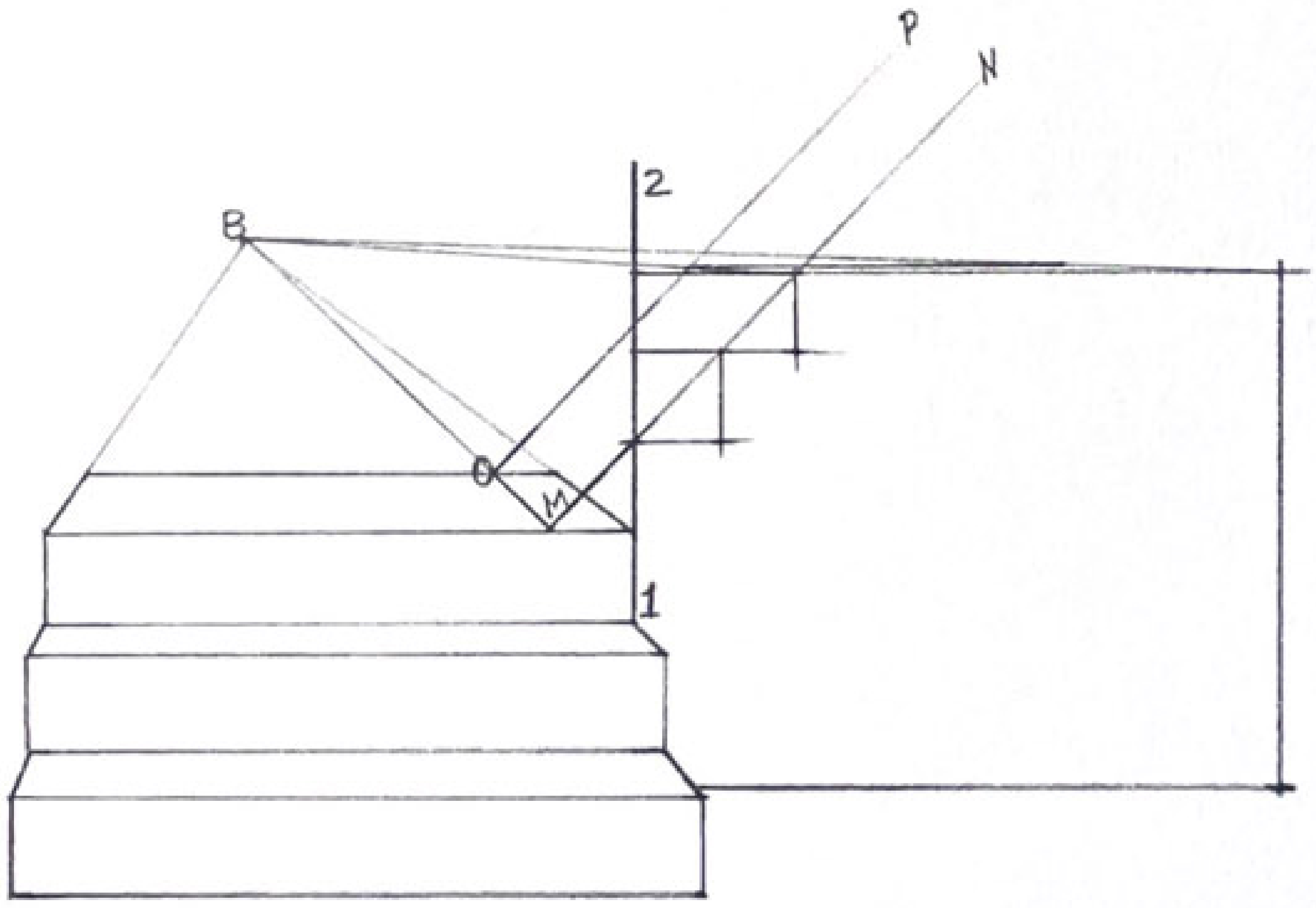
Here you can see how the artist used his ruler to straighten his sketch lines and to find the vanishing points. He extended the lines of the landing, A B and B C, and where they converged, at B, he established the horizon line. To locate the uphill vanishing point for the front angle of the ramp, the artist drew a vertical line through point B, on the horizon line. This is the vanishing trace (line D X). Next lines were extended from the ramp, or front angle of the stairs (F E and G E), and where they converged on the vanishing trace, the artist found the uphill vanishing point, point E. To finish the drawing he sketched in the risers and treads. The tread is the part your foot steps on and the riser is the back board that connects these horizontal treads.



In this drawing you can see how the artist found the correct height for the risers of the steps. He drew a vertical scaling stick next to the ramp; it just touches the bottom corner of the ramp. He then extended line B C to the scaling stick at point R. He next divided the distance between R and I into three equal spaces because there are three steps (including the landing). The artist then drew perspective lines from S and T on the scaling stick to the natural vanishing point, B. The front corner of each step's riser is found where these perspective lines cross the ramp line (H I). From the front corner of each riser the artist now dropped vertical lines (see C V) down to the next perspective line and this gave the height of each riser.



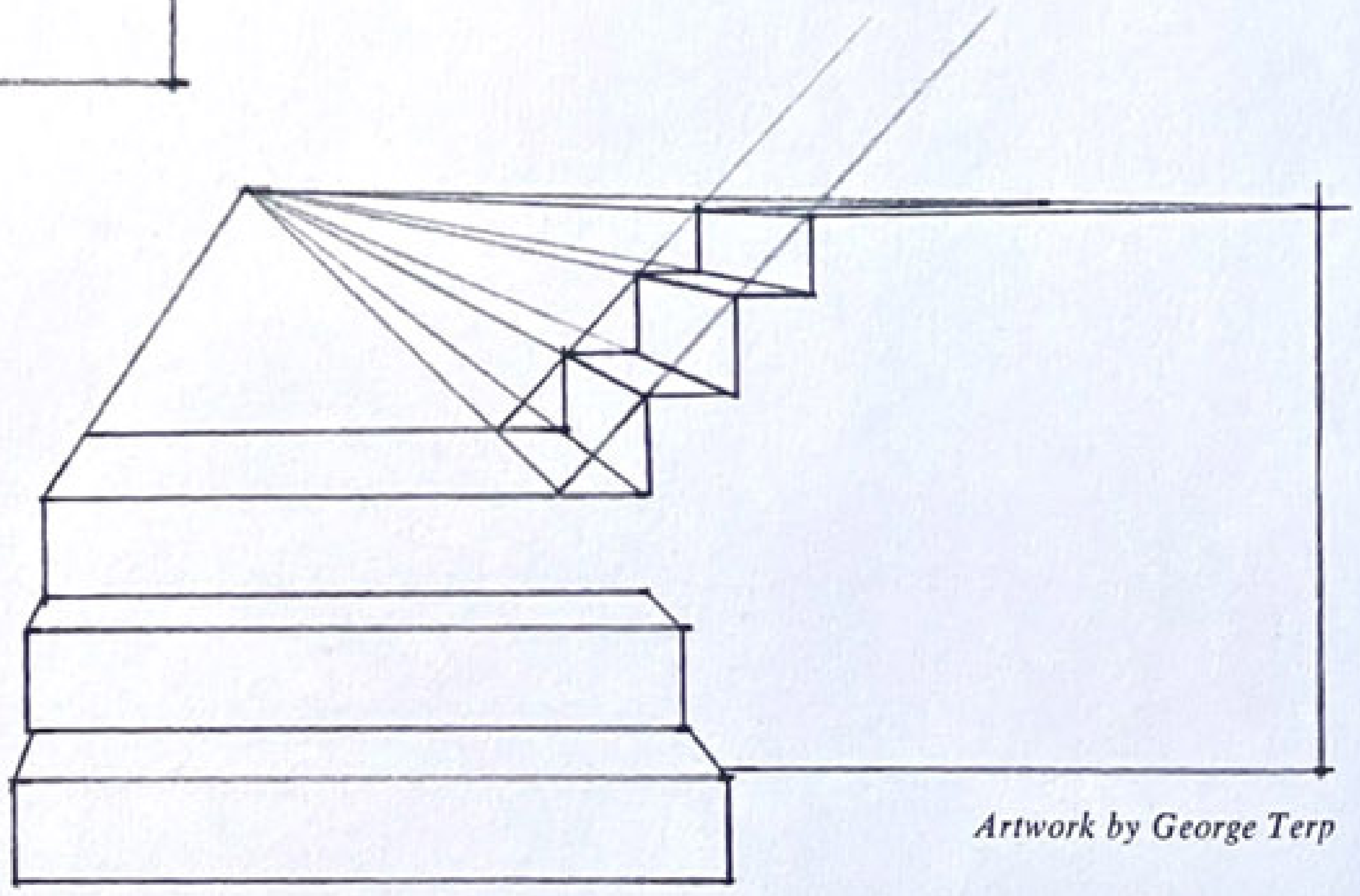
Here the artist used his T square to darken the horizontal lines . . . the front and back lines of the treads. After indicating these, he finished the risers on the left side of the stairs. A new scaling stick wasn't necessary for this work. The artist was able to construct the risers on the left by dropping a vertical line from the point where the horizontal tread line (J) crossed the left ramp line (at point Y), down to the next horizontal tread line (K). Then he connected the back edge of the tread (K) to the front edge (L) with a perspective line from W to the vanishing point (B). This same method was used to finish the other risers and treads on the left.



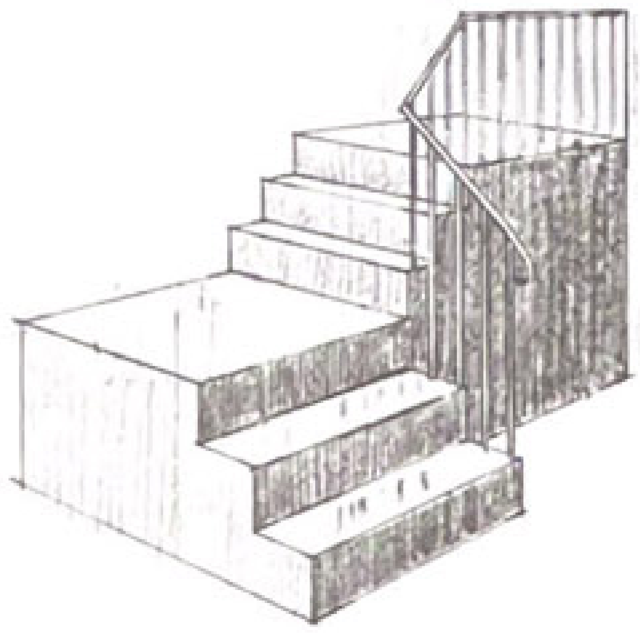
Here you see how the artist drew a second flight of stairs at an angle to the first. Note that the same vanishing point (B) on the horizon that was used for the first flight is still the guide for the second. Note also the new scaling stick (line 1-2). It is really an extension of the top riser on the first set of stairs. It is divided with the same measurement as the risers in the first flight.

Next the artist estimated the angle of the ramp, lines M N and O P. This ramp starts on the landing of the first flight of stairs and the front edge, M N, goes through the first measurement on the scaling stick. At each of the three measurements on the scaling stick, the artist drew horizontal lines which cross ramp line M N. At the points where these horizontals cross M N, the artist dropped vertical lines to indicate the height of the risers.

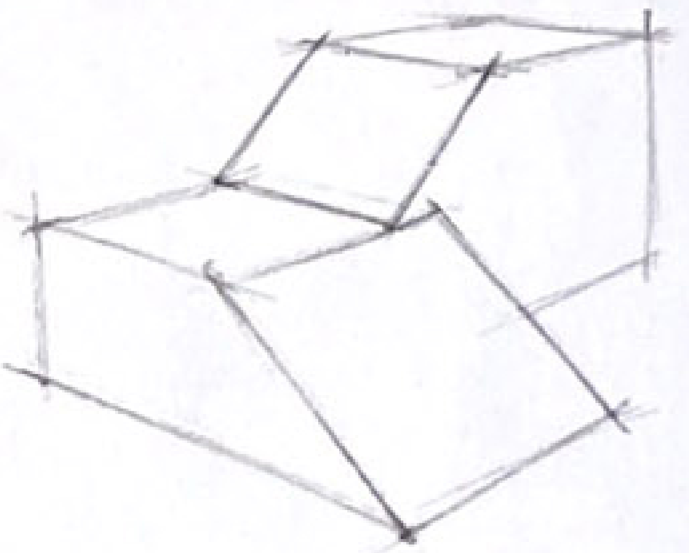
In the last drawing the artist extended perspective lines from the corners of the newly established risers to the vanishing point. He finished his drawing by darkening the horizontal and vertical lines that show the width of the treads and the height of the risers.



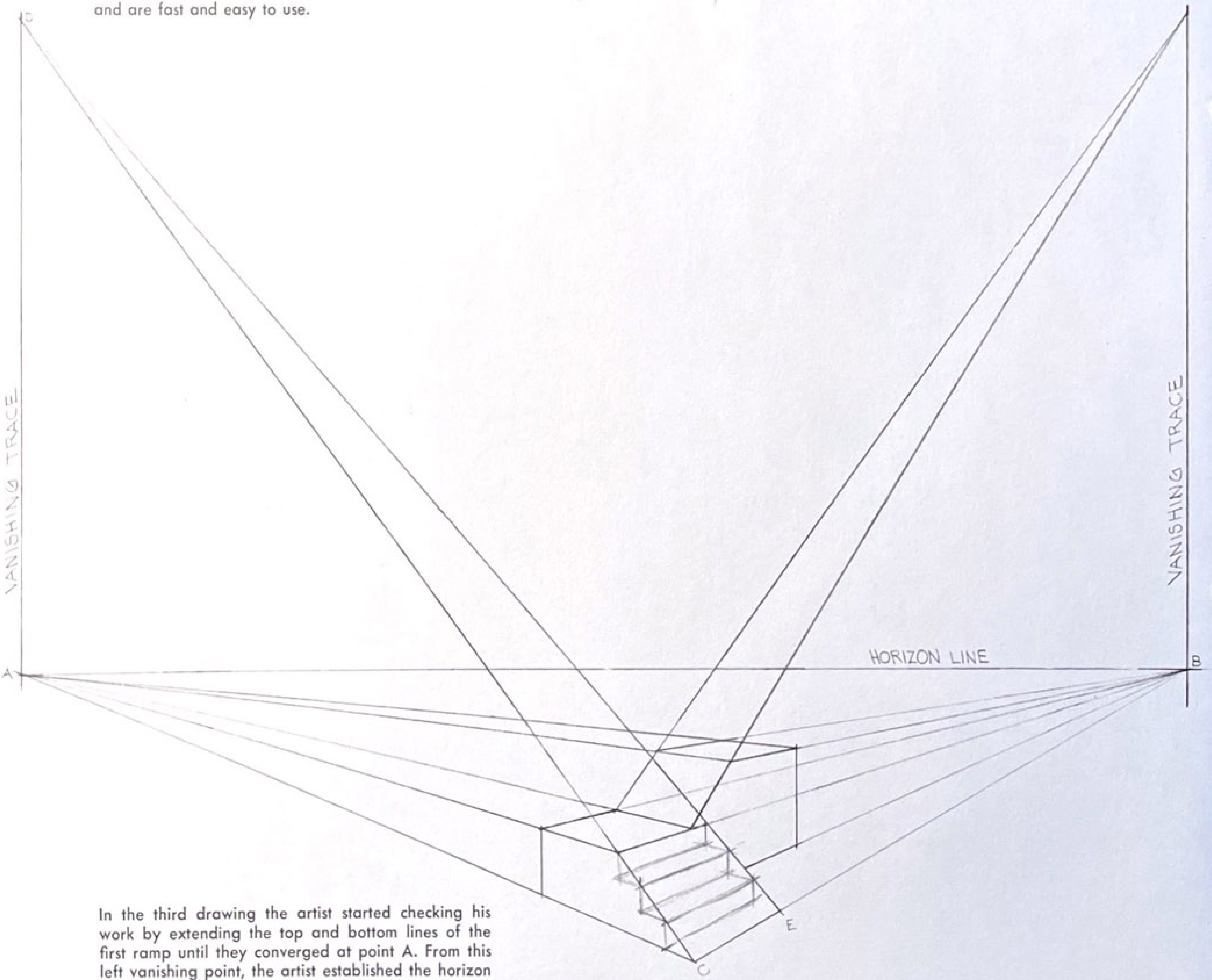
Artwork by George Terp



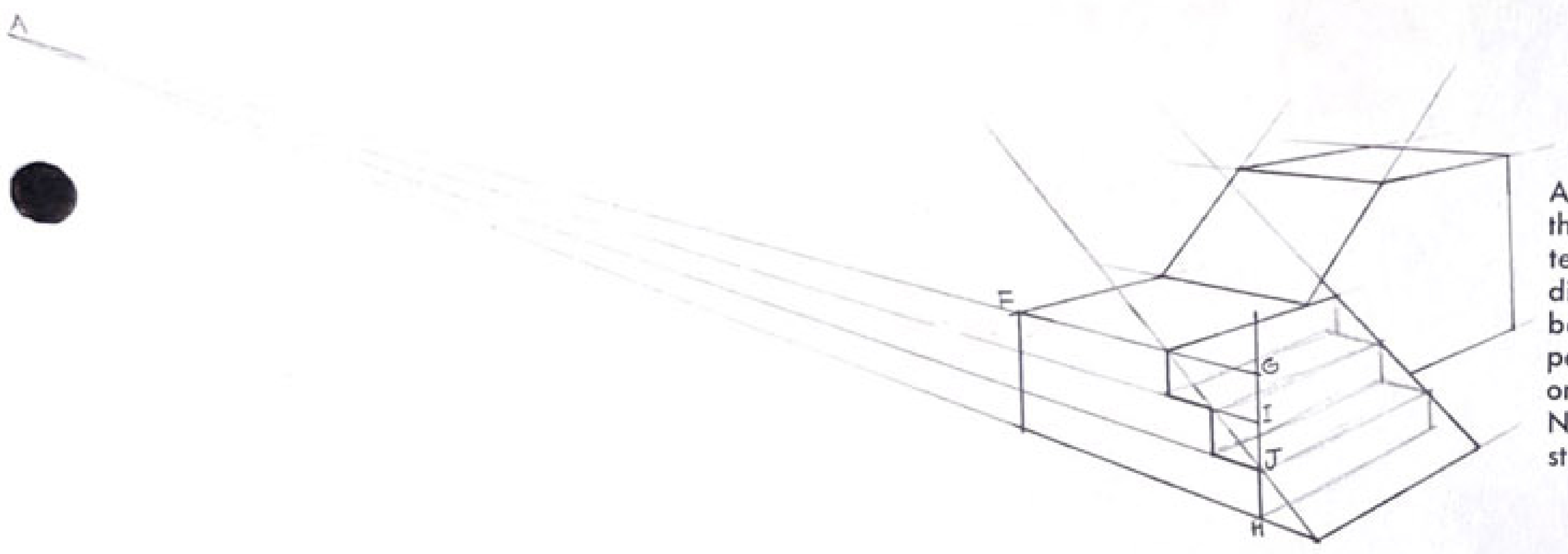
When the artist drew this two point staircase, he used basically the same procedure he used when he drew the one point staircase. Both projects started with free hand sketches and were later corrected by using rules of perspective and mechanical aids like the ruler, T square, etc. The finished rendering which looks like transparent wash is actually done with a felt tip marking pen. These come in an assortment of values and are fast and easy to use.



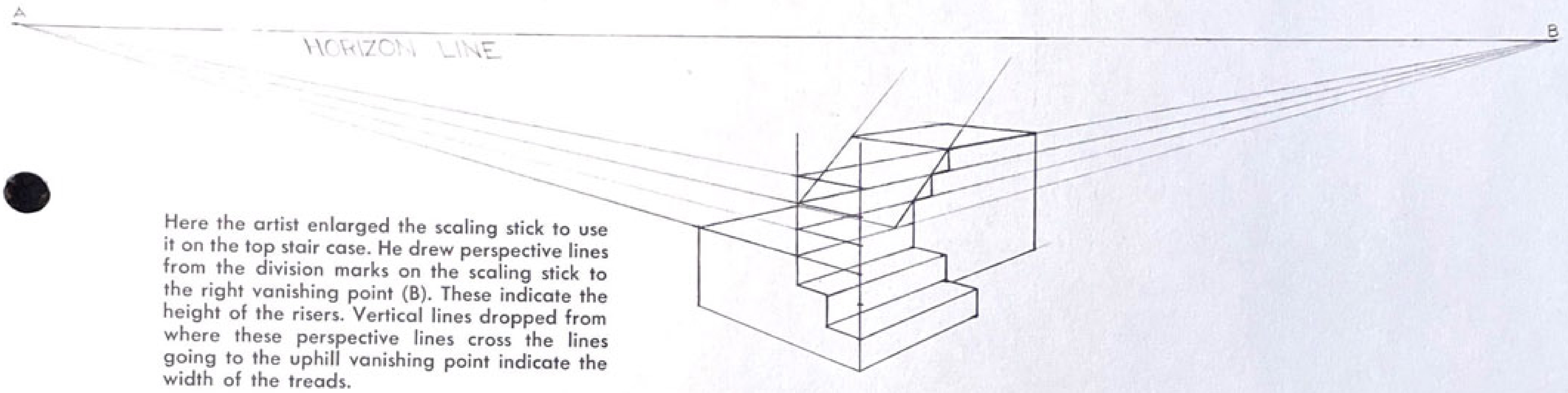
First the artist sketched the solid shape of the two stair ramps. In all your perspective assignments you should start with the largest and simplest shape and then develop details as you refine your drawing.



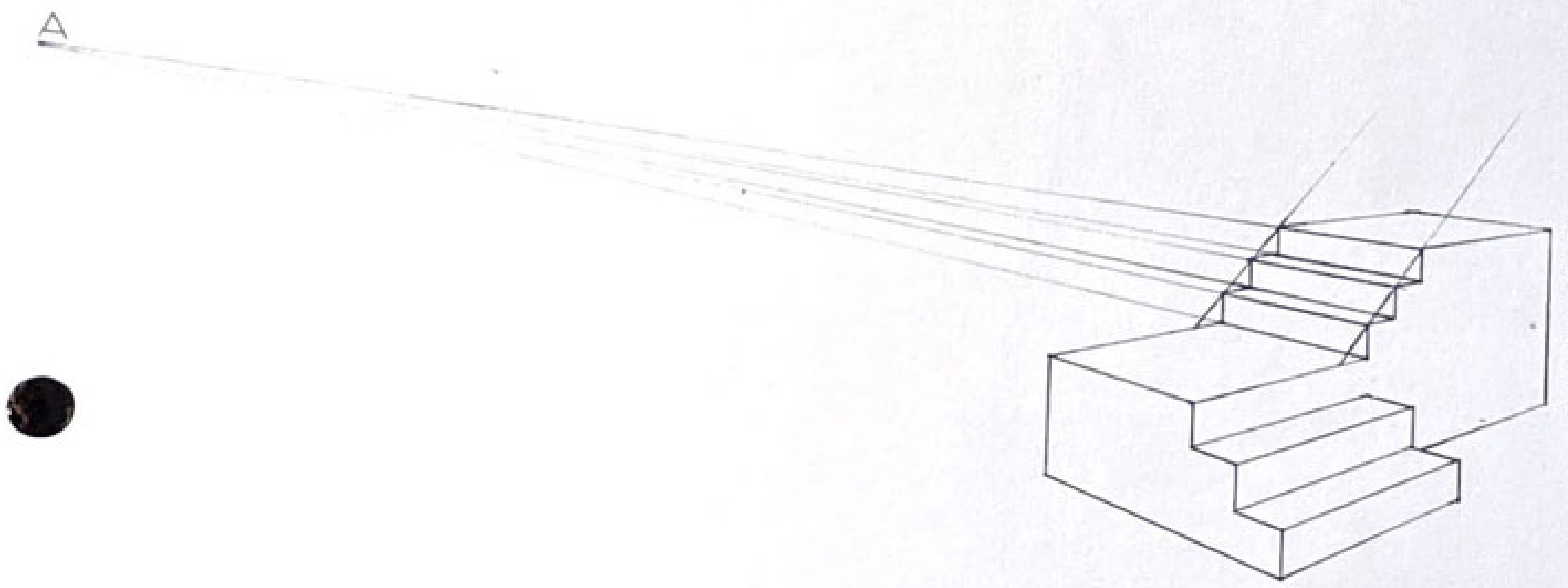
In the third drawing the artist started checking his work by extending the top and bottom lines of the first ramp until they converged at point A. From this left vanishing point, the artist established the horizon line. Then he found the right vanishing point for the remaining angles of the first ramp by extending lines to where they converged at B. Next he drew a vanishing trace through vanishing point A and another through vanishing point B. He extended the line for the front corner of the ramp (C D) to find the uphill vanishing point on the trace line and then drew line E D. The same method was used to find the uphill vanishing point for the top ramp. The artist finished the sketch by "roughing in" the risers and treads of the first (bottom) staircase.



A scaling stick was used to check the height of the steps for the bottom ramp. The artist extended line A F to the scaling stick at G. He then divided the scaling stick into three equal spaces because there are three steps. Next he extended perspective lines from the division points (I and J) on the scaling stick to the left vanishing point (A). Notice how these lines form the treads of the stairs but also show the height of the risers.

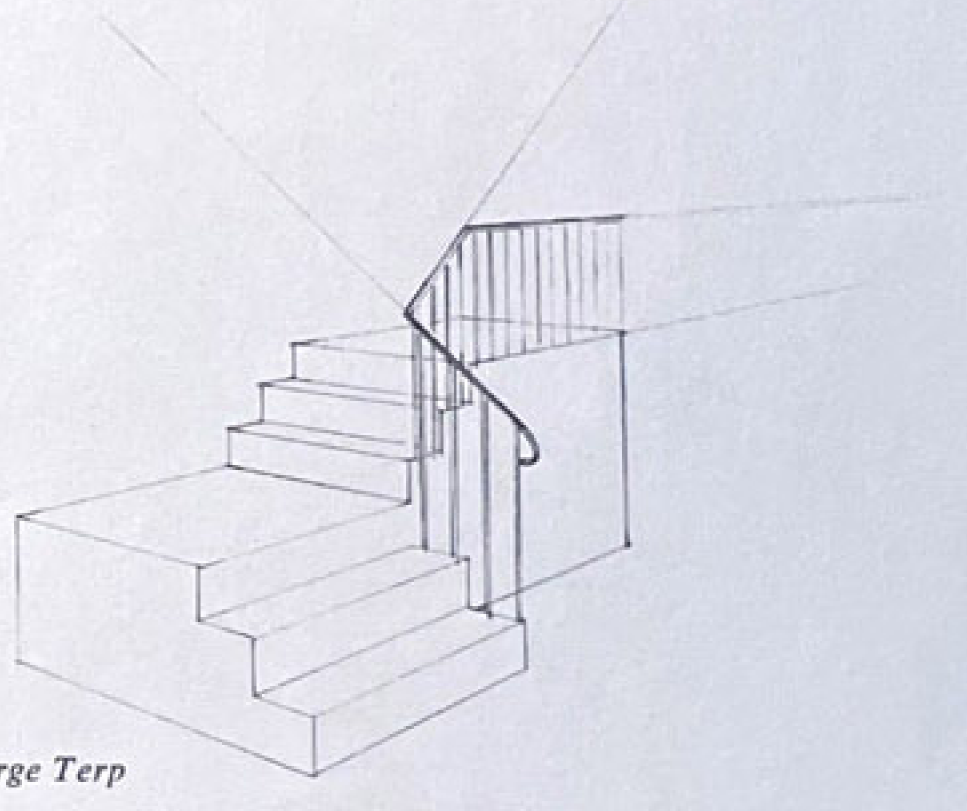


Here the artist enlarged the scaling stick to use it on the top stair case. He drew perspective lines from the division marks on the scaling stick to the right vanishing point (B). These indicate the height of the risers. Vertical lines dropped from where these perspective lines cross the lines going to the uphill vanishing point indicate the width of the treads.



Notice how the artist finished drawing the steps of the right (upper) ramp. He extended perspective lines from the corners of each step on the near side of the stair to the left vanishing point (A). These become the front and back part of each tread.

Here the artist arbitrarily established the height of the first post of the railing and then extended it up to the vanishing point on the left trace. This gave him an angle that is the same as the angle of the lower flight of stairs. The same method was used for the railing on the second flight of stairs. When drawing the many small uprights of the hand rail, the artist worked without any mechanical aids. Dividing and spacing methods could have been used to establish these posts.



Artwork by George Terp

Circles in Perspective

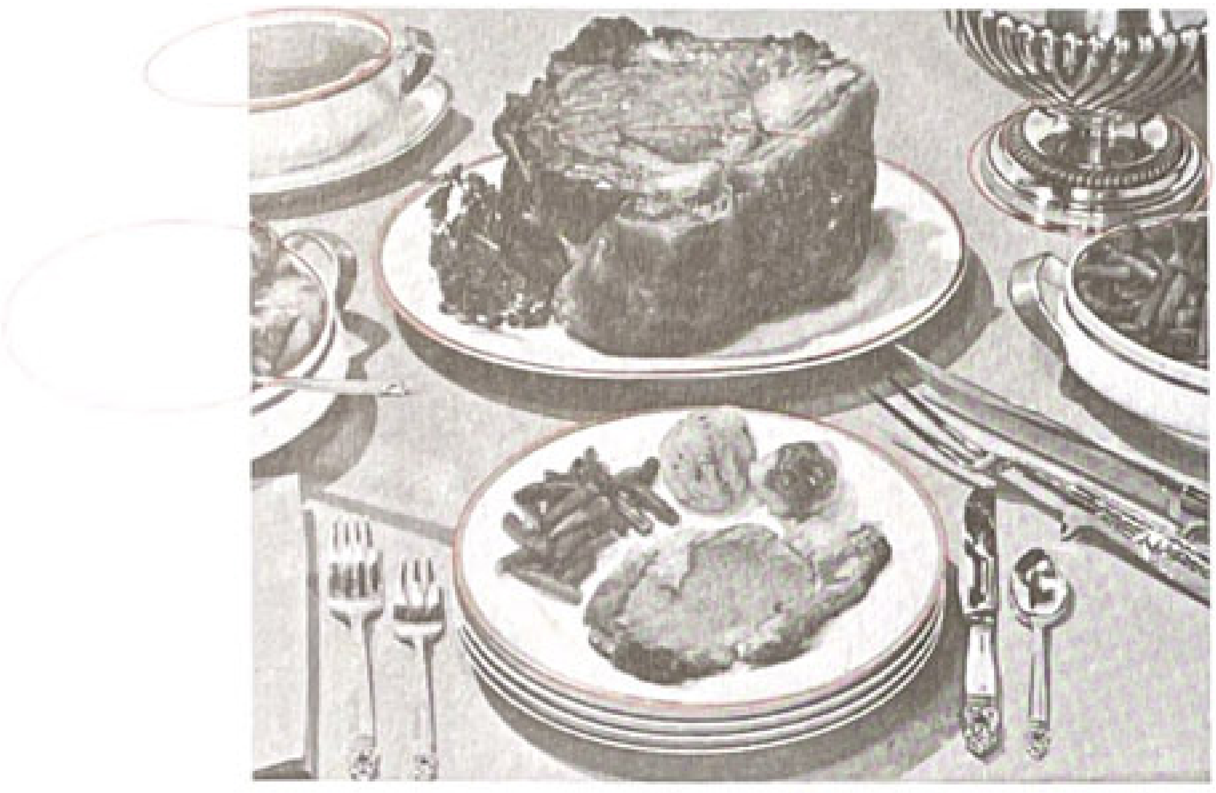
Study the circle on the cube you constructed earlier in this lesson. Now, move the cube around, tilting and turning it into various positions. The circle seems to change shape, doesn't it? When you hold the side with the circle directly in front of you, the circle looks perfectly round – you could draw it with a compass. But, as you tilt or turn the cube so that the circle side moves away from you, the circle seems to flatten out. You know that it is still a circle, but it no longer looks like a circle to you. What you see is an ellipse.

As you continue to study the effect of seeing the circle from different angles, you will begin to recognize the fact that the farther the circle turns away from you in any direction, the more distortion appears in the circle. Or, to turn that about, the closer your view of the circle is to "straight on," the more closely what you see resembles the circle. So, the ellipse you see is determined by the angle at which you view the circle.

There are few times when you will see circles "straight on." You will usually see them at an angle. And, remember – circles seen at an angle no longer look like circles, but are ellipses. Thus, to draw circles in perspective, you will have to learn to draw ellipses. Make some practice sketches of ellipses right now. Your ellipses should look like "flattened" circles, but they should always have rounded ends.

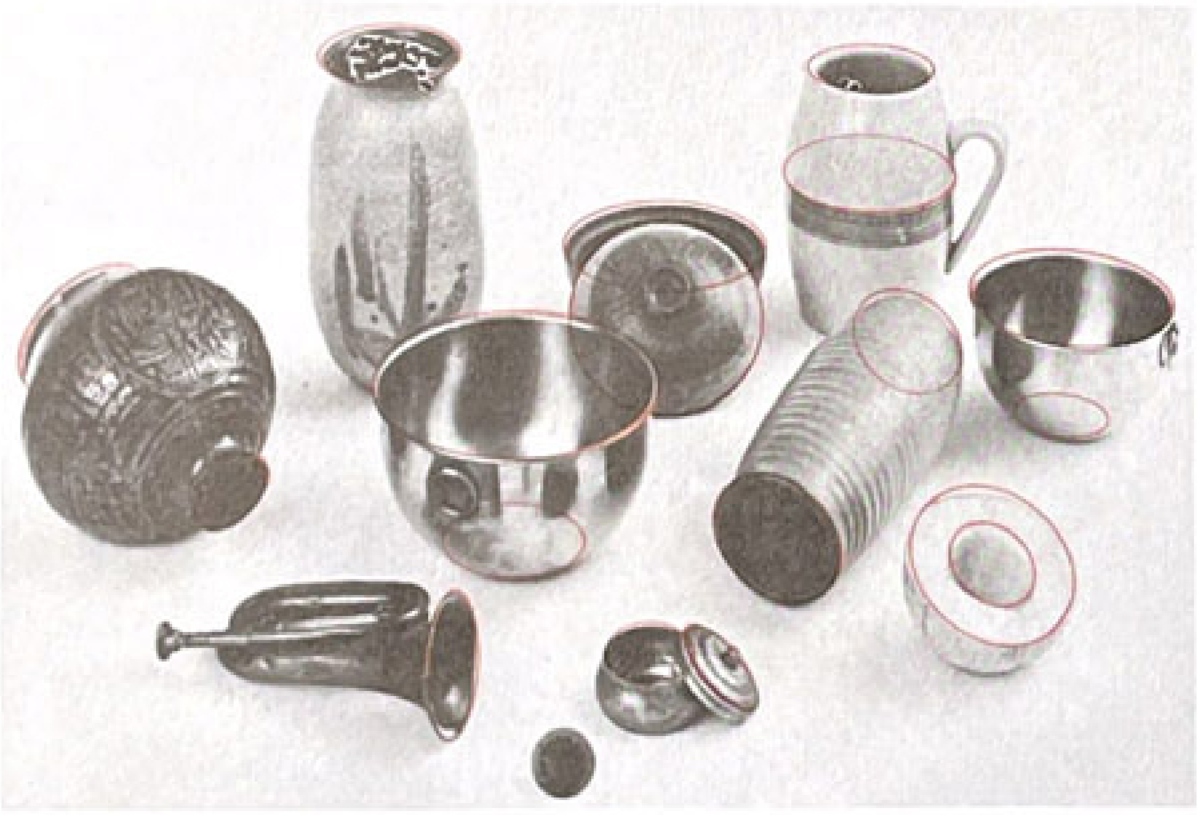
WHAT TO DO

It takes considerable practice to draw ellipses. At first they look lumpy, "cock-eyed", and just plain sloppy. However, if you keep practicing a few minutes every day, you'll see big improvements. Draw from the cube you constructed, the one with the circle on it, or spread a number of plates on the floor and sketch them.



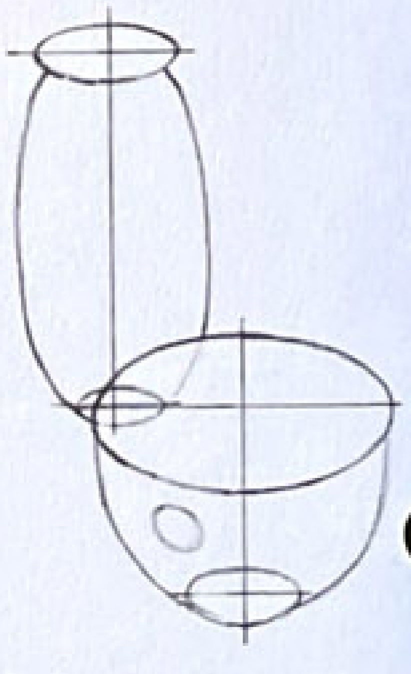
Photograph by H. Armstrong Roberts

You can tell from sketching these free hand ellipses that it's difficult to get the front and back curves smooth. In this section, you will learn some perspective techniques to help you perfect these drawings. Read on. Study the ellipses in this photograph of the table setting. Notice the way the artist emphasized the different shapes of the ellipses by outlining them. Compare the ellipse of the dinner plate in front to the ellipse of the gravy boat in back. The plate seems much more rounded (more like a circle) than the flattened gravy boat because the angle of viewing is different for these two objects.



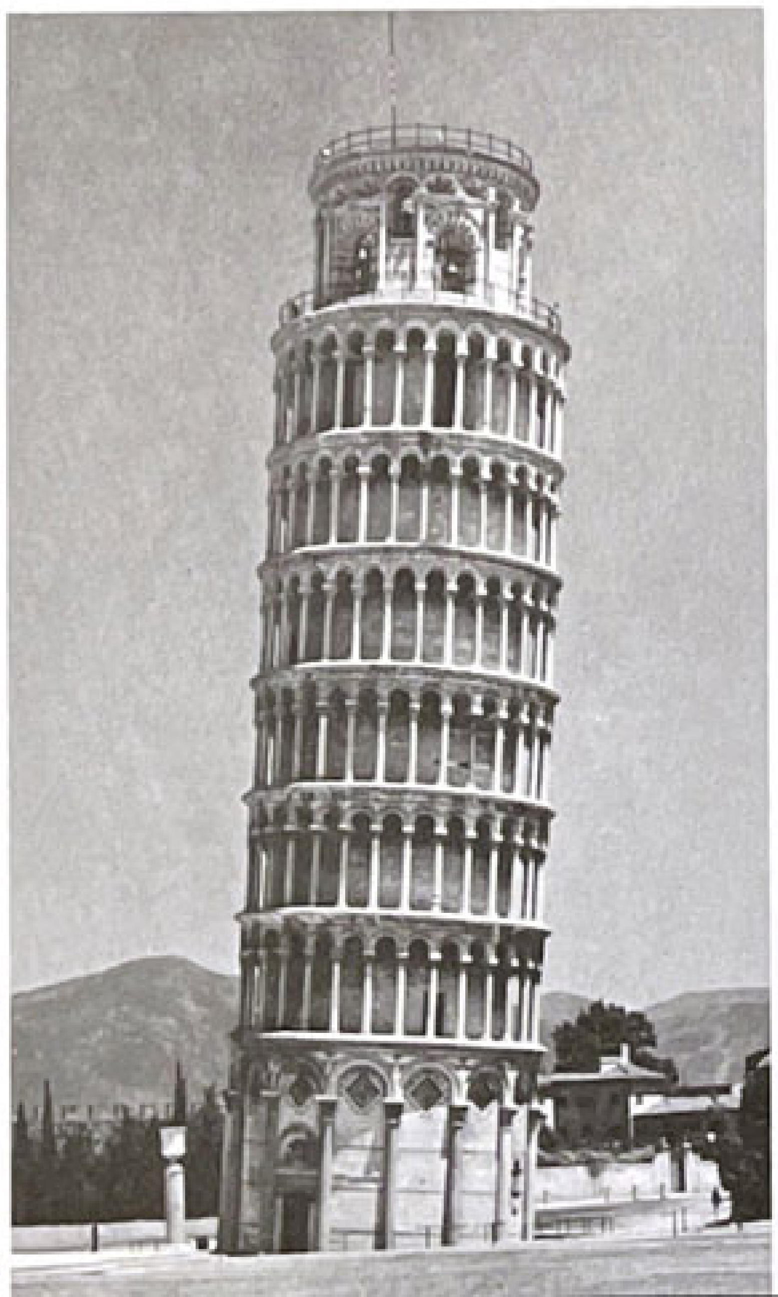
Photograph by Bob Blanch

All of the objects in this photo have perfectly round (circular) openings. However, here you see them at different angles. This distorts their circular shapes into elliptical shapes. Some of the ellipses are quite flat, others are fuller and closer to being true circles.

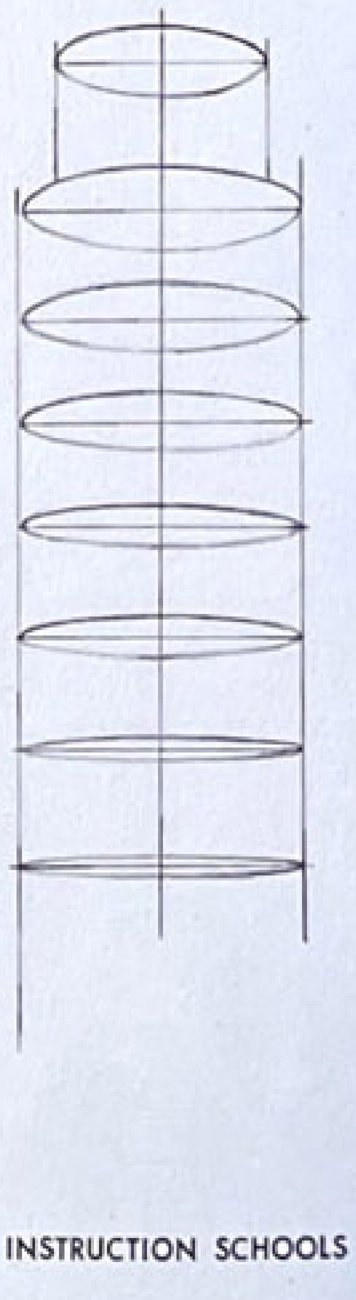


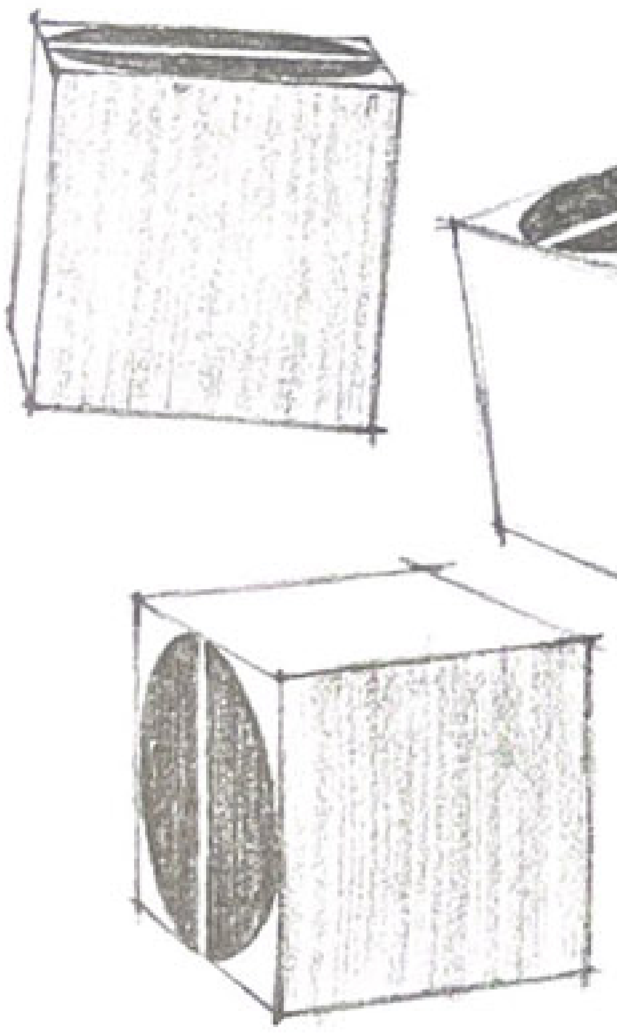
In the sketches from the "still life" photograph the artist added guide lines to the pots to explain the ellipse. The short lines that go across the widest part of the ellipses are called axis lines. The longer vertical lines are called axle lines. In these drawings, the axle lines run up and down through the centers of the two pots and join the ellipses at the top to the ellipses at the bottom, just as the front axle of a car joins the two front wheels.

Photograph by H. Armstrong Roberts

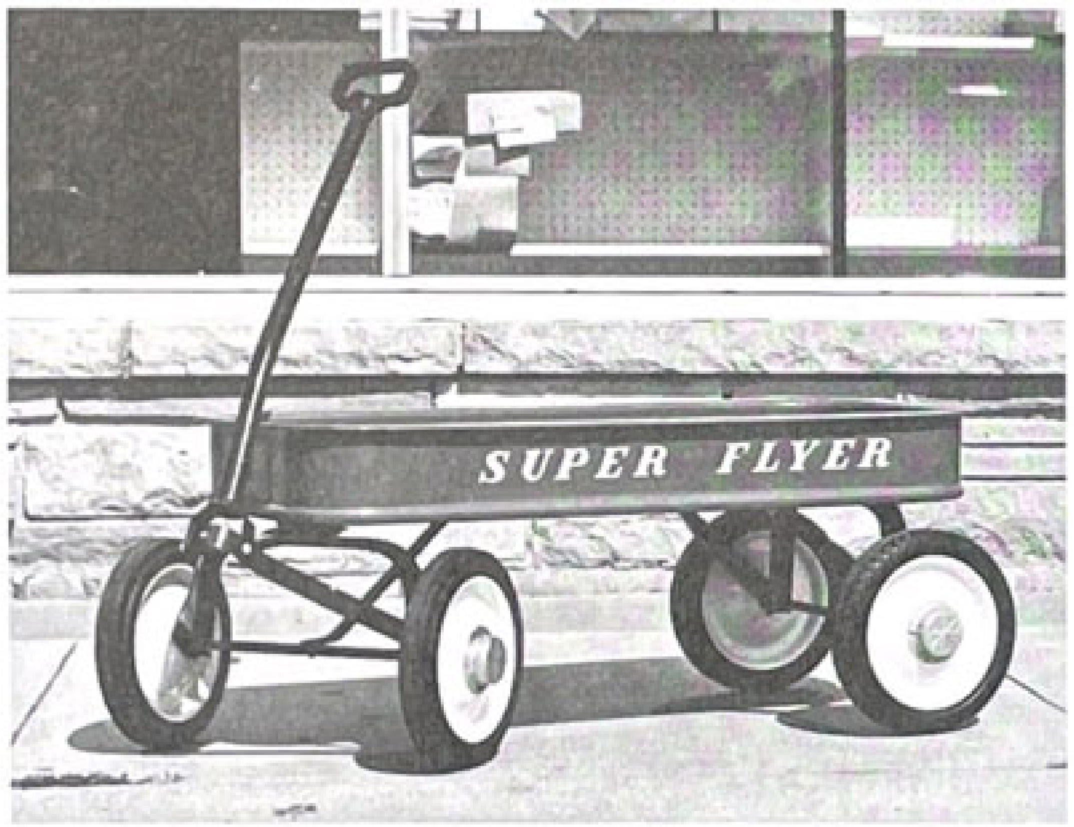


Compare the photo of the Leaning Tower of Pisa to the drawing made from it. In the drawing the artist used a see-through method to emphasize the shapes of the ellipses. Because the top ellipse was so far above the eyelevel of the artist, it had a much different shape than the bottom ellipse which is almost on the eyelevel line. The bottom ellipse is almost "squashed" flat. The top ellipse has less distortion. It is fuller and much closer in shape to a circle.





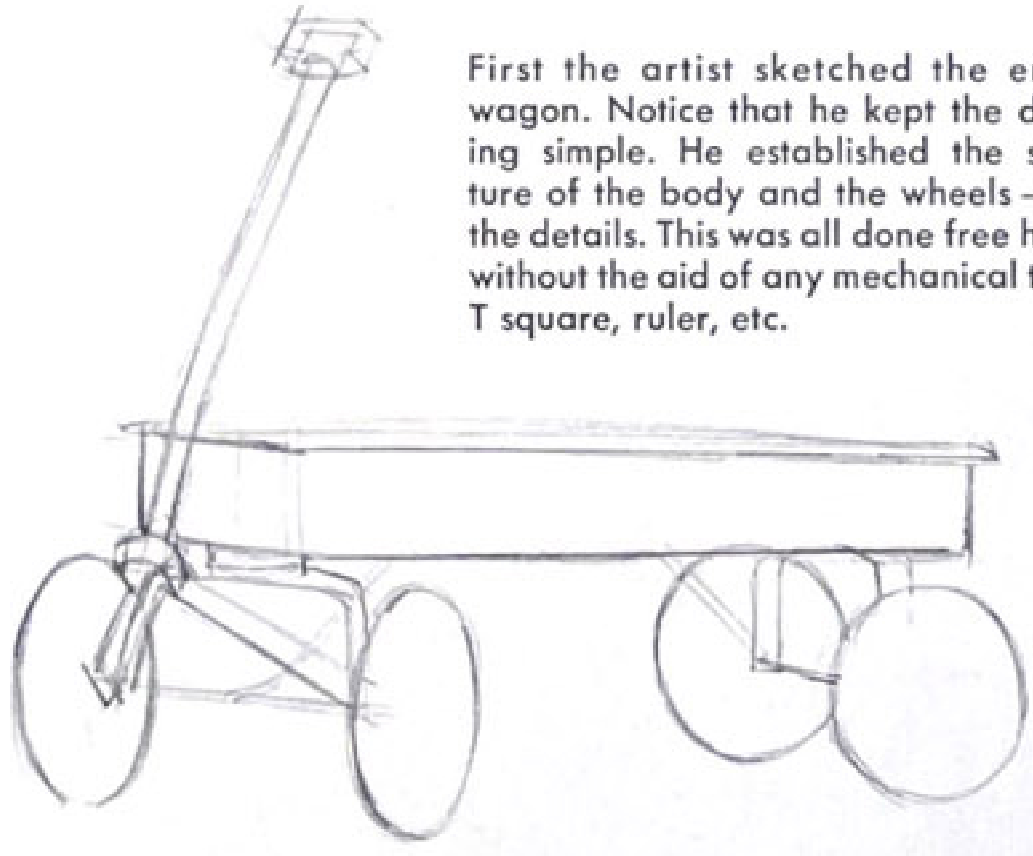
These cubes have circles on them, but because they are viewed at an angle, the artist drew what he saw — ellipses. You will immediately notice that the half of the ellipse closer to you appears wider than the half on the opposite side of the middle line. Why? Remember . . . objects look smaller as they move farther away. Practice drawing the cube you constructed. Draw the circle on it from many different angles. Remember to notice how the shape of the ellipse depends upon the angle you view the circle from.

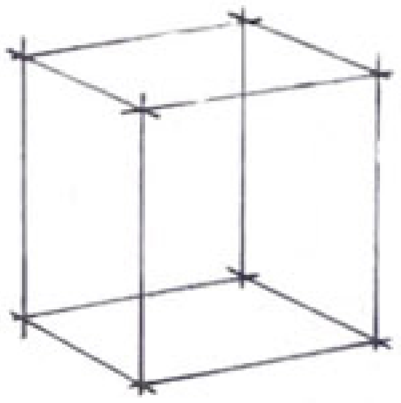


Photograph by Bob Blanch

The artist made his drawing from this photograph of the wagon. As you can see the front wheels are very definite ellipses, while the back ones are closer to being circles.

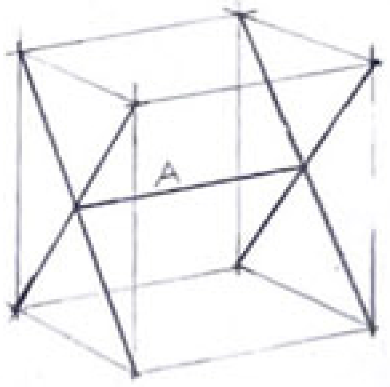
First the artist sketched the entire wagon. Notice that he kept the drawing simple. He established the structure of the body and the wheels — not the details. This was all done free hand, without the aid of any mechanical tools, T square, ruler, etc.

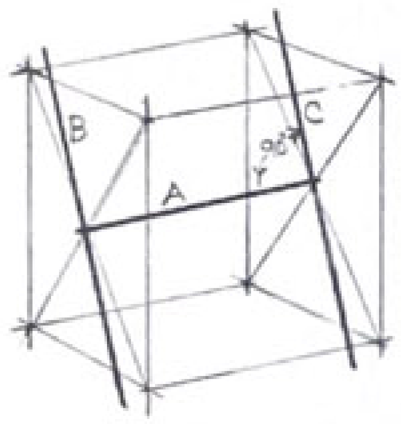




In the following demonstration a transparent "see through" box has been constructed to serve as a guide in developing a cylinder. This box helps establish the elliptical ends of the cylinder, the axis of each end, and the axle between them.

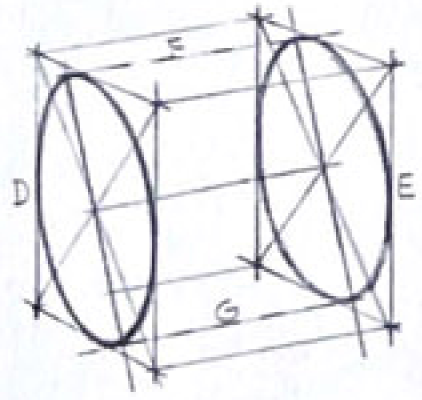
In this step the artist drew diagonal lines from corner to corner on both ends of the box. The diagonal lines made it possible to find the exact centers of the left and right ends of the box. He then drew line (A) from the center of the left end to the center of the right end. This line represents the axle of the two ends.

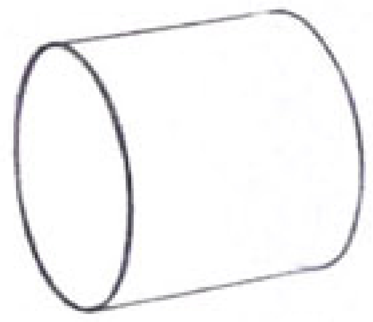




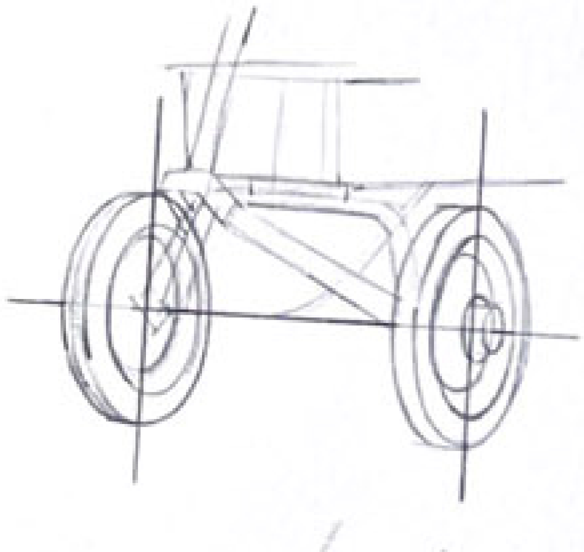
Next the artist drew in the axis of each end (B & C). To do this the artist had to use the right angle of his triangle (90 degree angle). Keep in mind that the axis is always at a right angle to the axle. Also, the axis is always at the widest part of the ellipse (it runs from the narrowest point of one side of the ellipse to the narrowest point of the other side of the ellipse).

Here the artist sketched in the two ellipses (D & E). Notice that the axis runs through the widest part of the ellipse. After he drew in the ellipses, he drew the two lines (F & G), the sides or walls of the cylinder. These run from each end of the axis on the left ellipse to each end of the axis on the right ellipse.





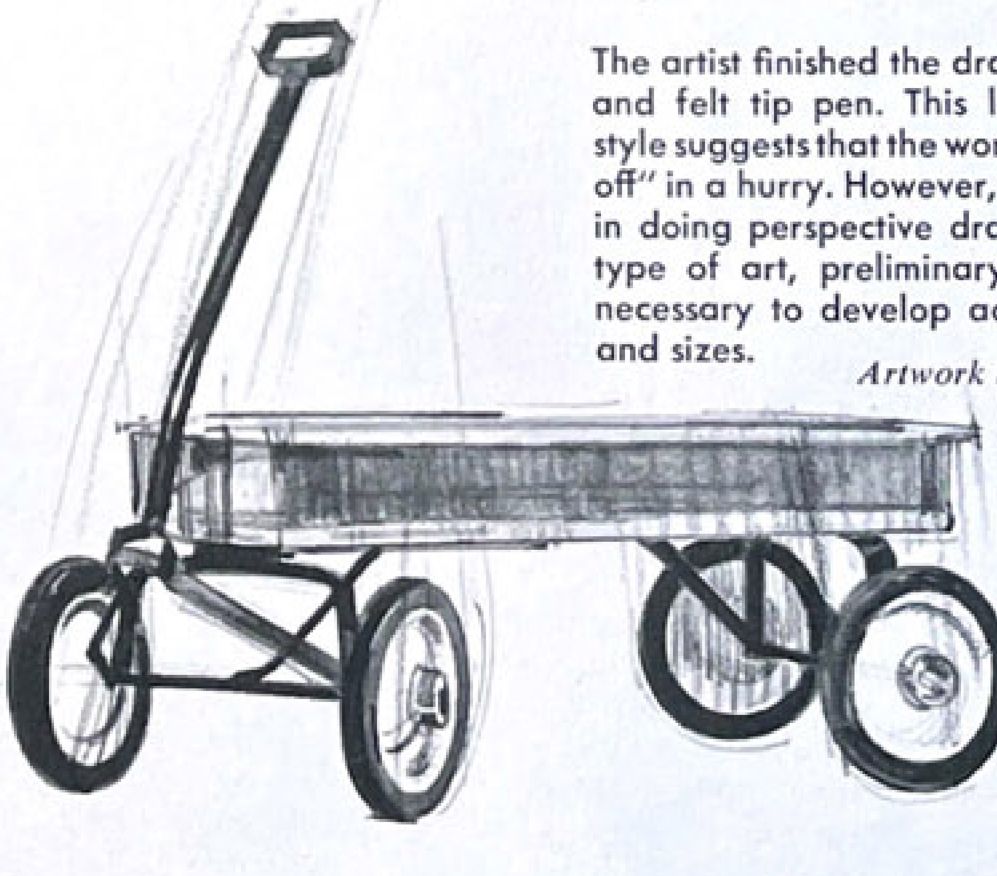
The artist then erased the unnecessary guide lines and darkened the lines of the cylinder. You will be using both ellipses and cylinders in many of your future pictures.



The body of the wagon could easily be checked with the same perspective methods used when constructing a two point box. The artist also could have checked the ellipses of the wheels by constructing boxes around them. However, because of his well-trained eye and years of experience, he knew his work was accurate. The only thing he checked was whether the axle, from wheel to wheel, formed a 90 degree angle with the axis of each wheel.

The artist finished the drawing in pencil and felt tip pen. This loose, "flashy" style suggests that the work was "dashed off" in a hurry. However, you know that in doing perspective drawings, or any type of art, preliminary sketches are necessary to develop accurate shapes and sizes.

Artwork by George Terp



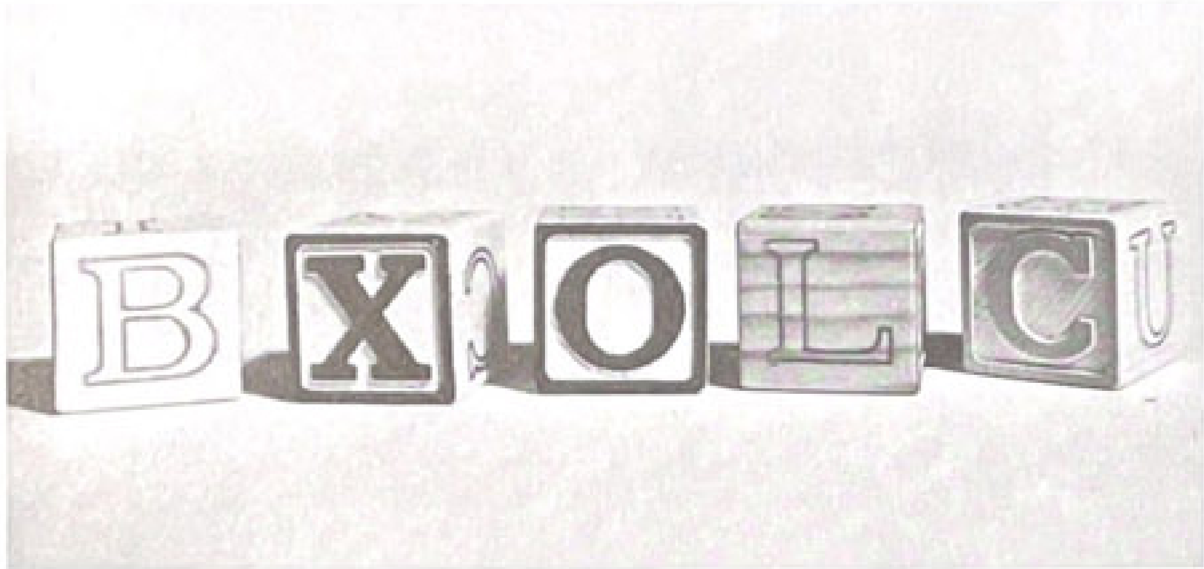
Dividing and Spacing

Everyone has noticed how telephone poles alongside a highway seem to get closer together as they recede into the distance. Just as objects appear to get smaller as they get farther away, the spaces between them also appear to shrink. And when objects are evenly spaced in a line, such as telephone poles, fence posts, or columns on a building, this change is striking.

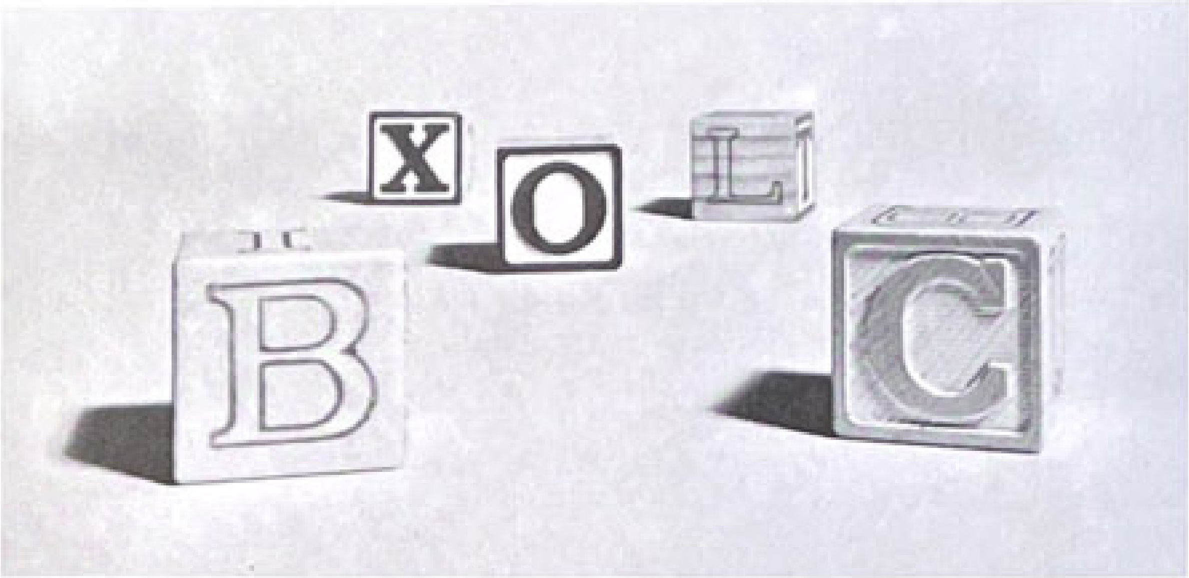
Drawing a row of evenly spaced objects accurately is difficult if you use only your naked eye. Fortunately, however, there is a special perspective rule to help you with this type of drawing. On these two pages there are demonstrations of how to use the *dividing* and *spacing* rule. Study them carefully and practice each step. Before you know it, you'll have added another important item to your knowledge of Perspective.

WHAT TO DO

You should be able to find a fence or group of telephone poles near your home. Go out and make a careful sketch of them and then check your work by using the spacing and dividing rules taught here.

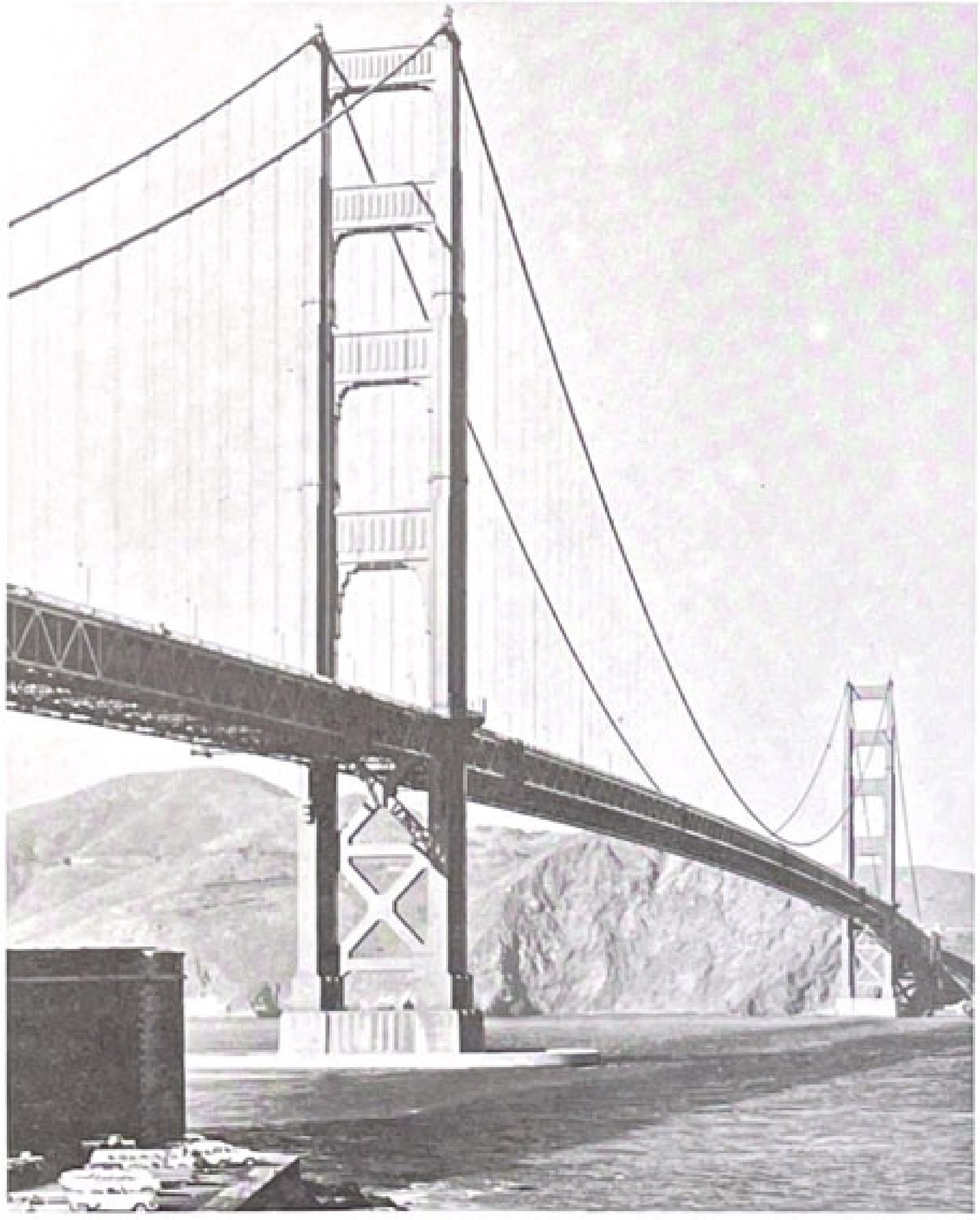


By comparing the two photos of the children's building blocks, you see an example of how objects appear to get smaller as they get farther from the viewer. Here you see that all the blocks are the same size. They are all approximately the same distance from the camera.



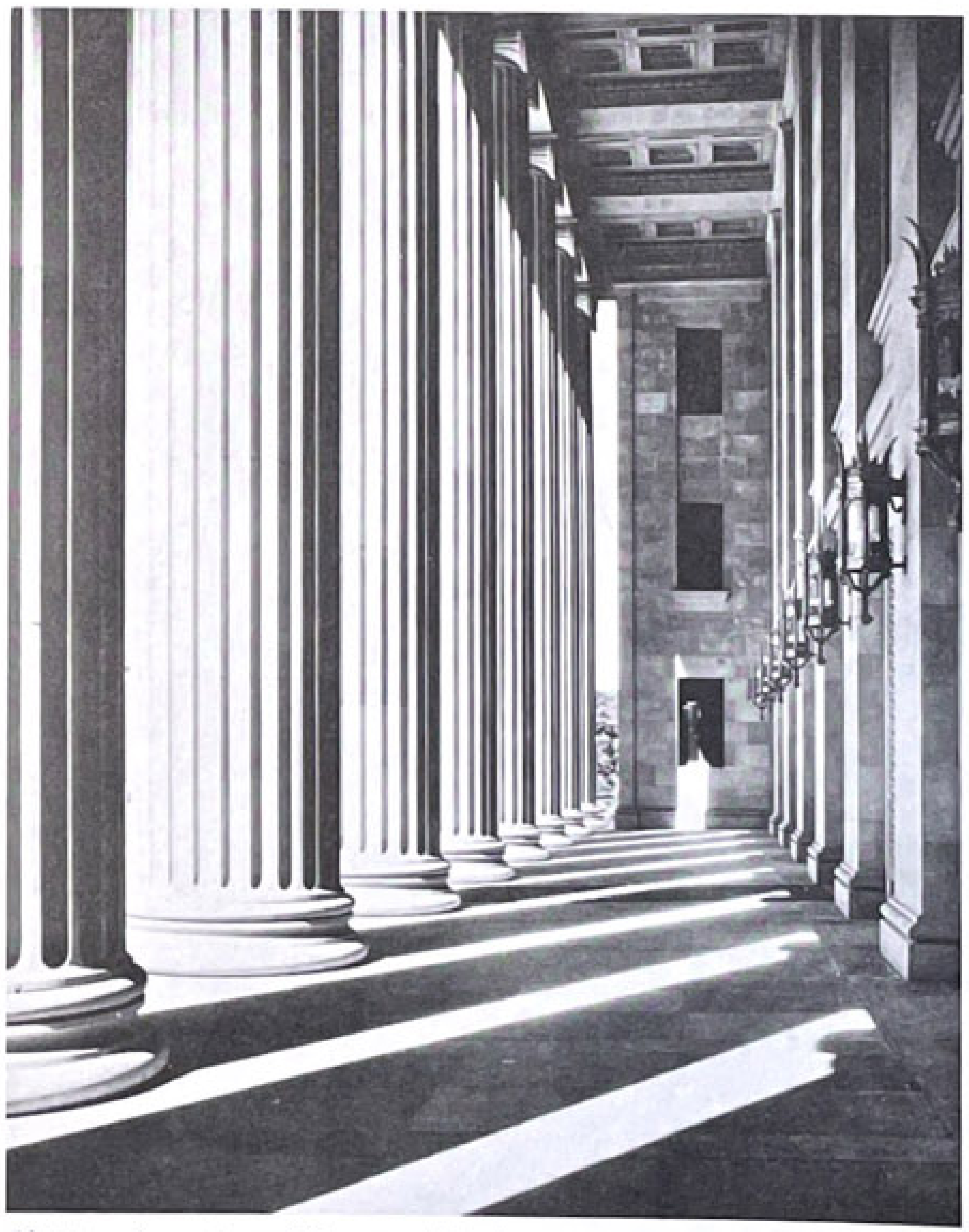
Photograph by Bob Blanch

Now, because the blocks are at various positions in space, some appear smaller than others. Blocks B and C are close to the camera and look quite large. Blocks X, O, and L have been moved away from the camera and they now look much smaller. Remember, though, that all the blocks are really the same size; they only appear different because some are farther away from you.



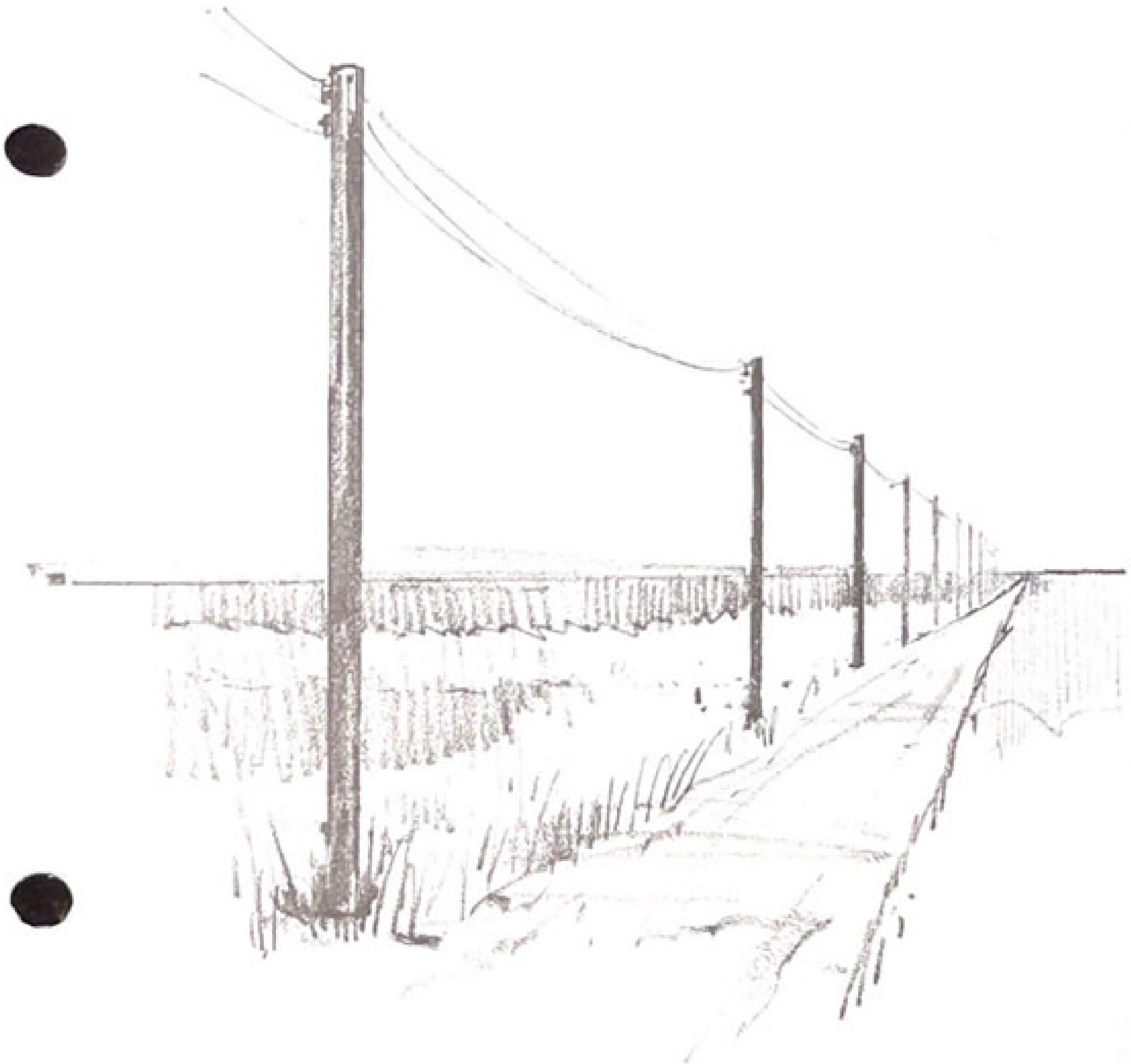
Photograph by Harold M. Lambert

Study the two vertical supports of the Golden Gate Bridge. The distant support seems much smaller than the closer support. This, as you know, is because objects appear smaller as they go toward the horizon. In your drawing, you might guess at this size change, but you can get accurate measurements if you use the perspective rules for Dividing and Spacing.



Photograph courtesy of Norton and Peel

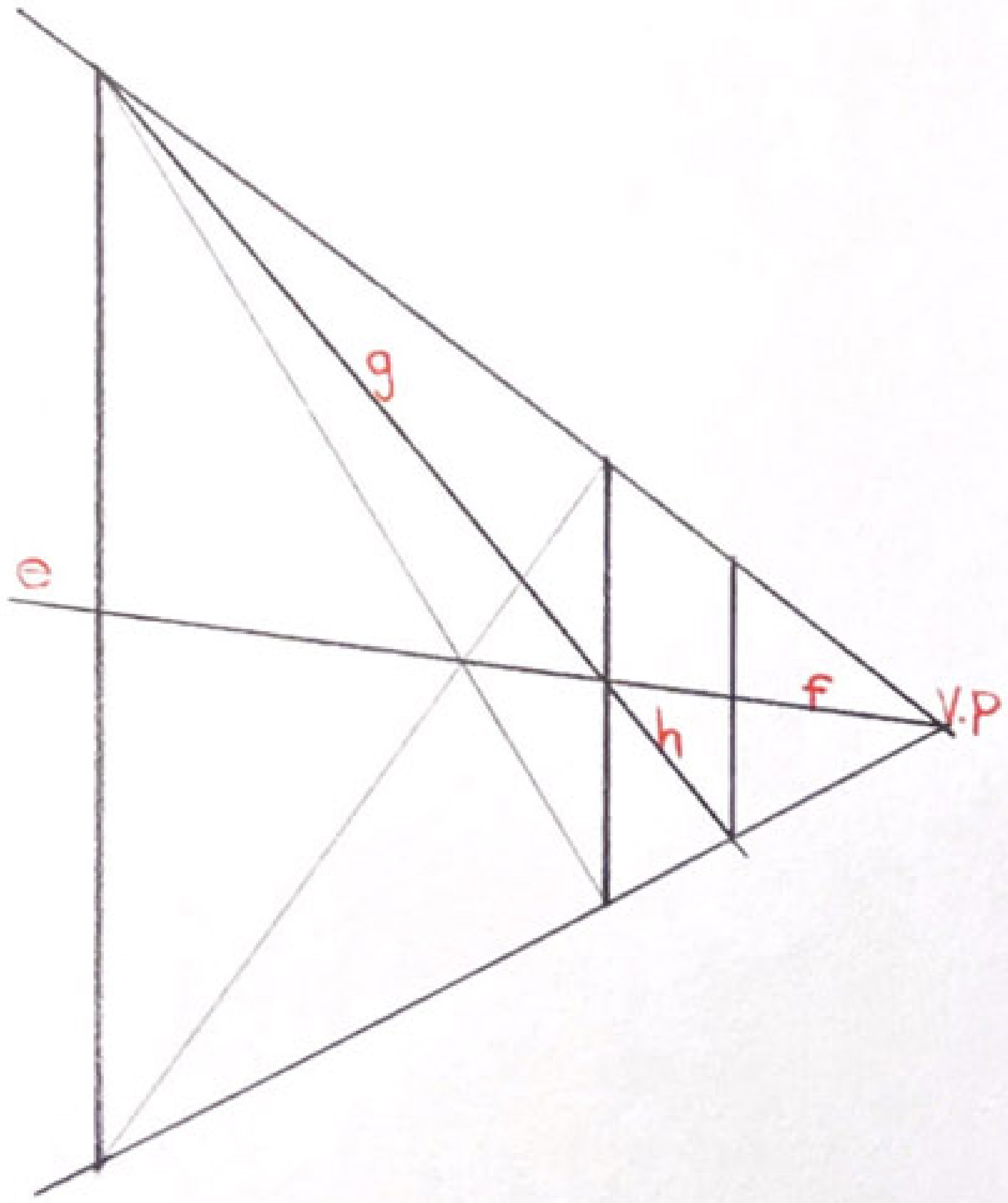
The columns in this photograph not only get smaller as they get farther away from you, they also seem to get closer together. Study the photo. There are many times when you will want to draw a row of evenly spaced objects. To do this with accuracy, you will have to learn the dividing and spacing rules.

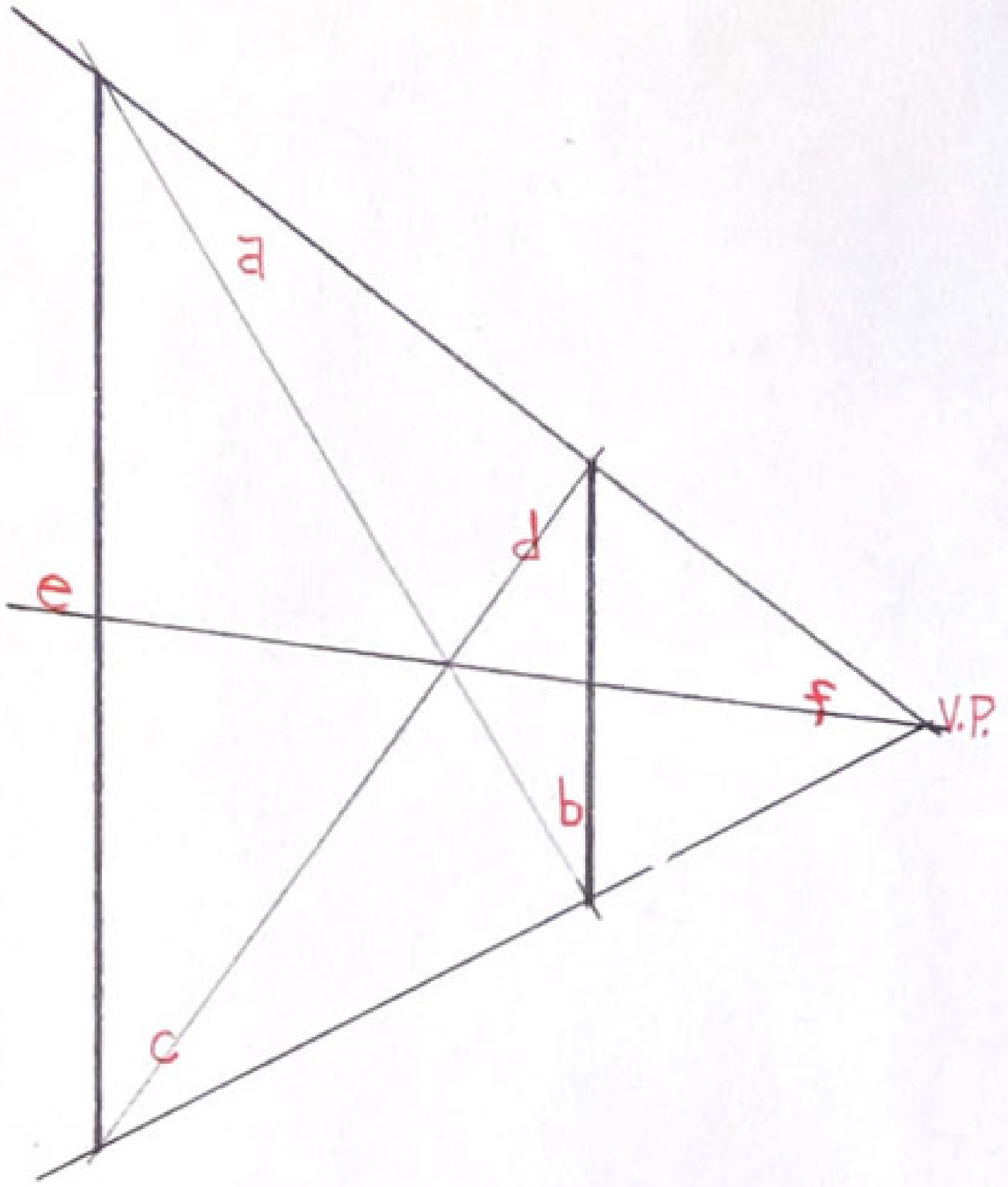


Artwork by George Terp

Notice that the telephone poles in this drawing seem to get closer and closer together as they get farther and farther away. Also notice that these poles get shorter as they go toward the horizon.

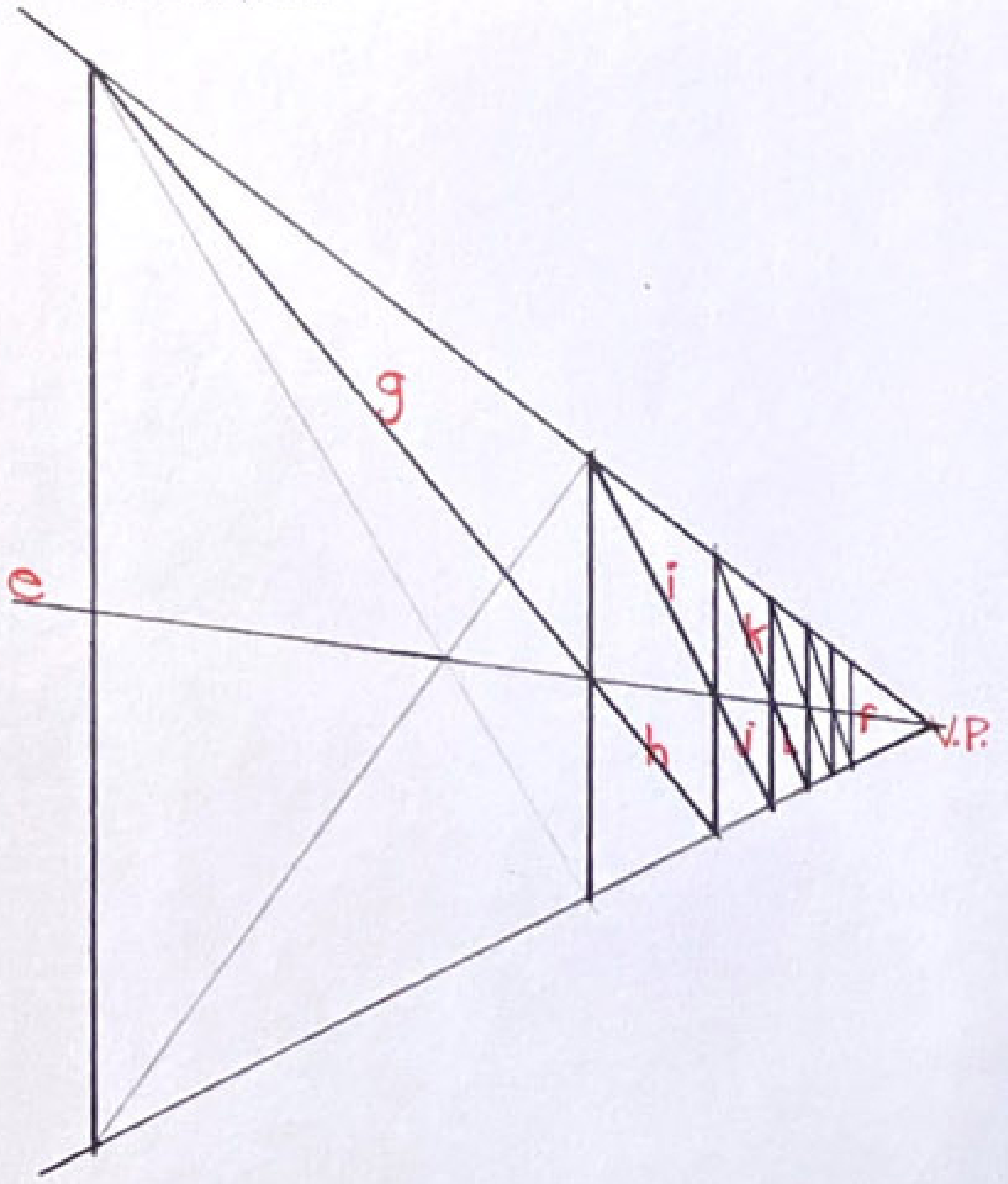
To locate the third pole, the artist drew a diagonal line (gh) that started at the top of the first pole and went through the middle of the second pole . . . where the middle guide line (ef) crosses the second pole.

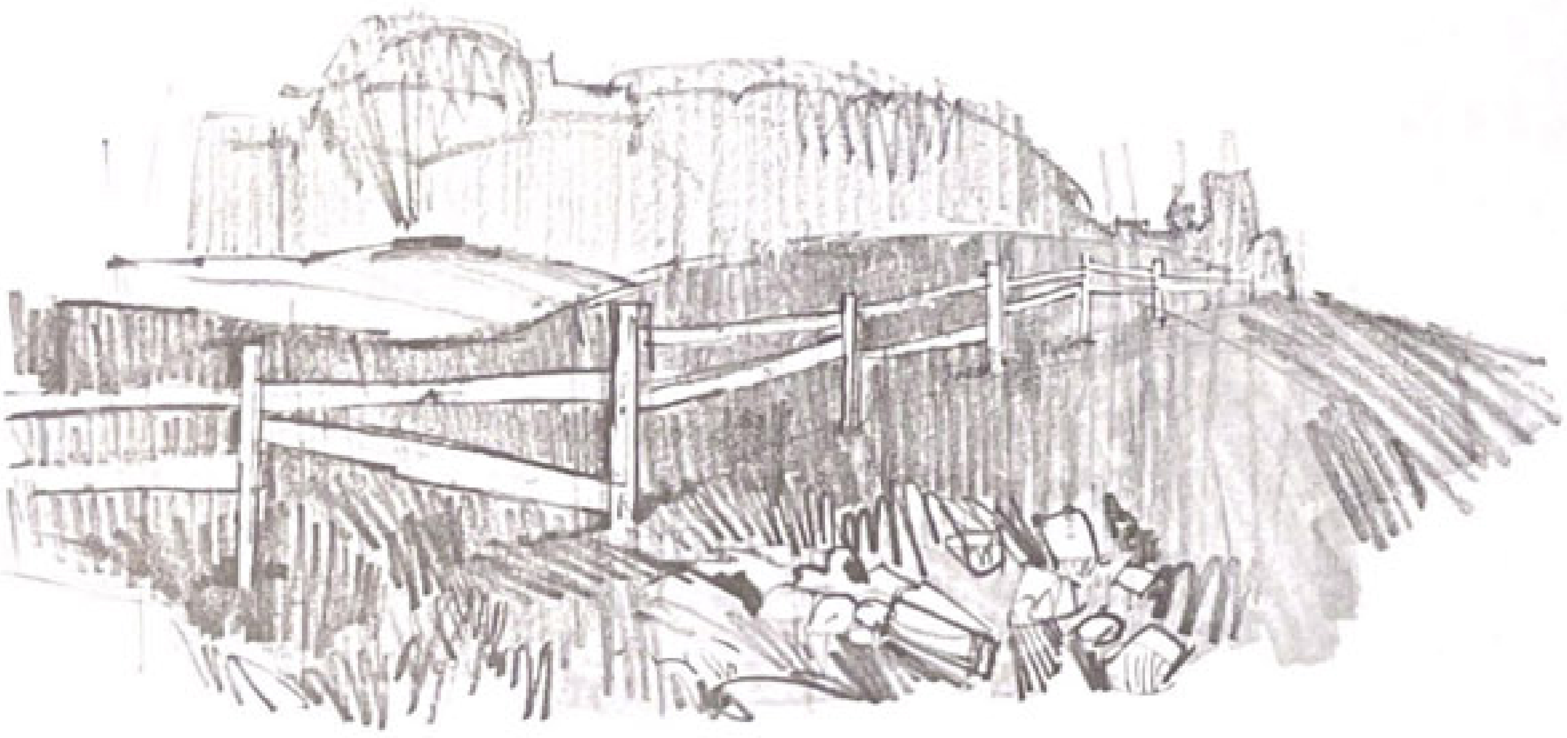




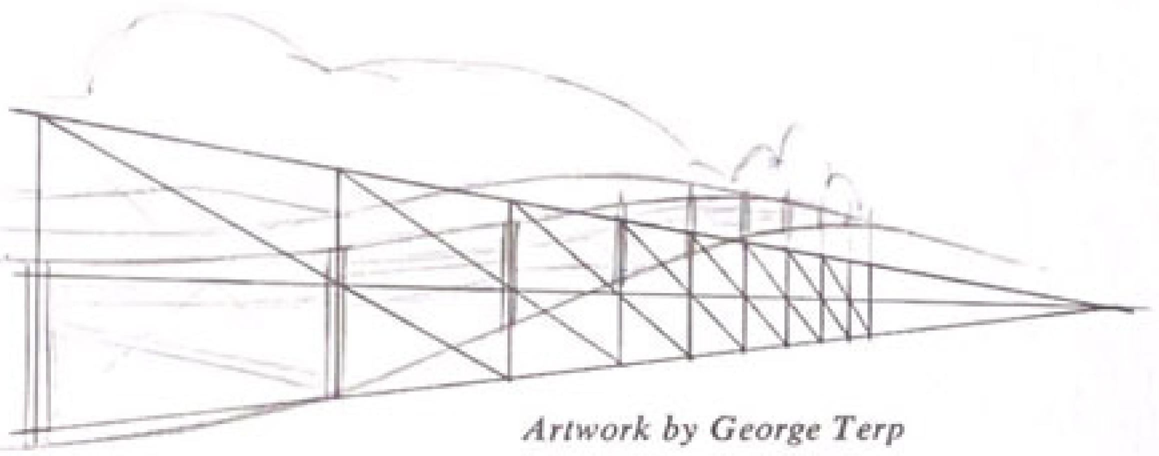
To draw the telephone poles, the artist first drew a vertical line to represent the height of the closest telephone pole. Then he extended perspective lines from the top and bottom of this to a vanishing point on the horizon. These perspective lines are to control the height of the other poles. There is no mechanical way to find the distance between the first and second pole — it must be spaced by eye. With a careful guess, the artist drew a second vertical line to represent the second pole. Next he drew diagonal lines (ab and cd) from corner to corner between the first and second poles to find the exact center of the space between them. The artist then ran a guide line (ef) through this center point to the vanishing point.

The artist used the same procedure for the rest of the poles. For instance, to find the location of the fourth pole the artist went back to the top of the second pole and drew a diagonal line (ij) that went through the middle of the third pole . . . where the middle guide line (ef) crosses the pole. Where the diagonal line touched the bottom guide line on the ground, the artist added the fourth vertical line representing the fourth pole. In placing the fifth pole the artist went back to the third pole, drew a diagonal line from the top of it through the middle of the fourth pole (line kl) and drew a vertical line where this diagonal line touches the bottom guide line. Try drawing this scene yourself . . . use all seven poles.

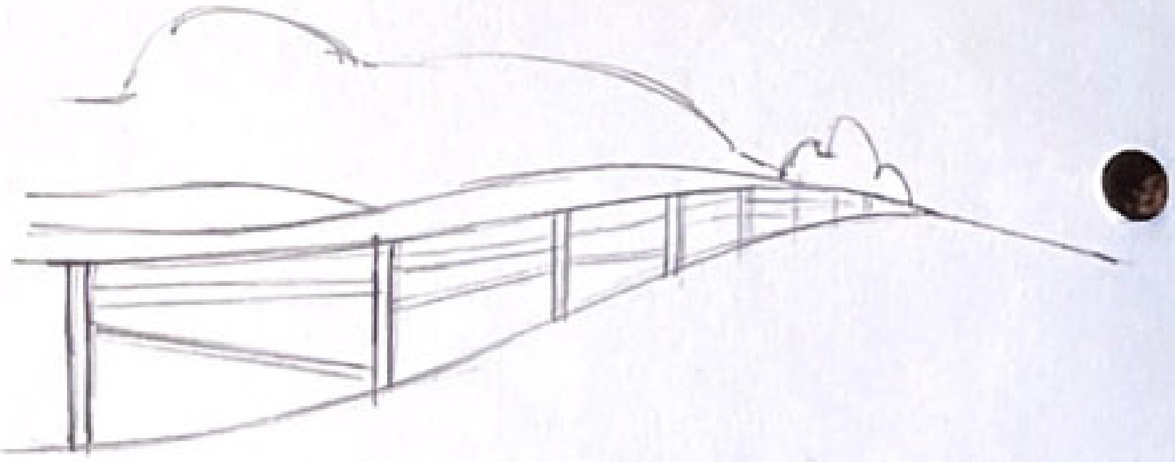




The vertical posts in this fence are evenly spaced even though they appear closer together and smaller as they go into the distance. To construct this fence on a hill, you follow almost the same procedure used for spacing the telephone poles on flat ground.



Artwork by George Terp

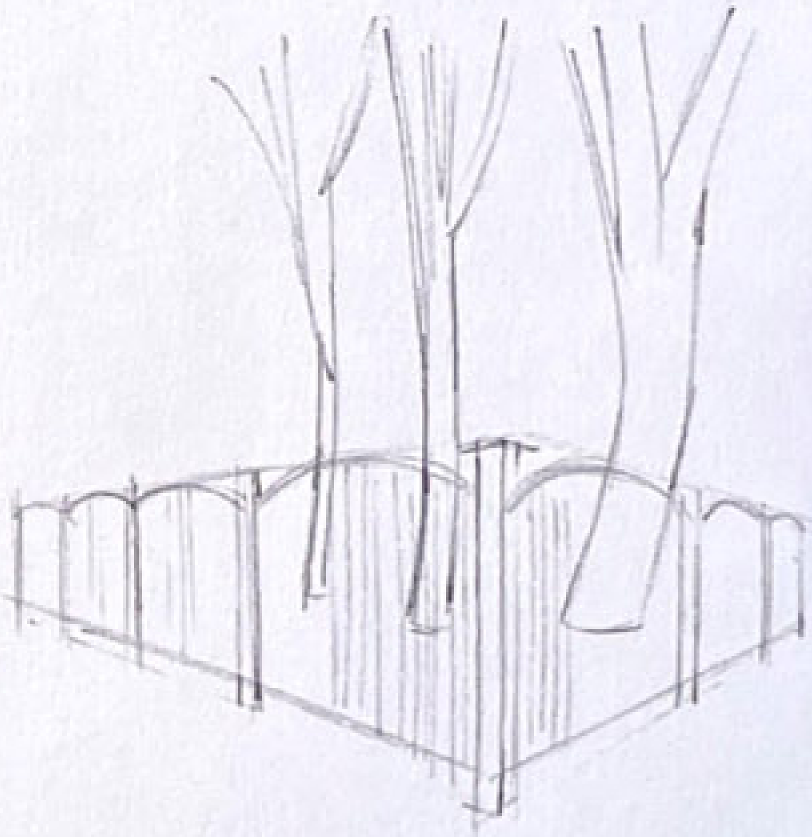


First the artist made a sketch of the fence and the hill. Notice how he kept it simple, lightly indicating the posts and cross bars.

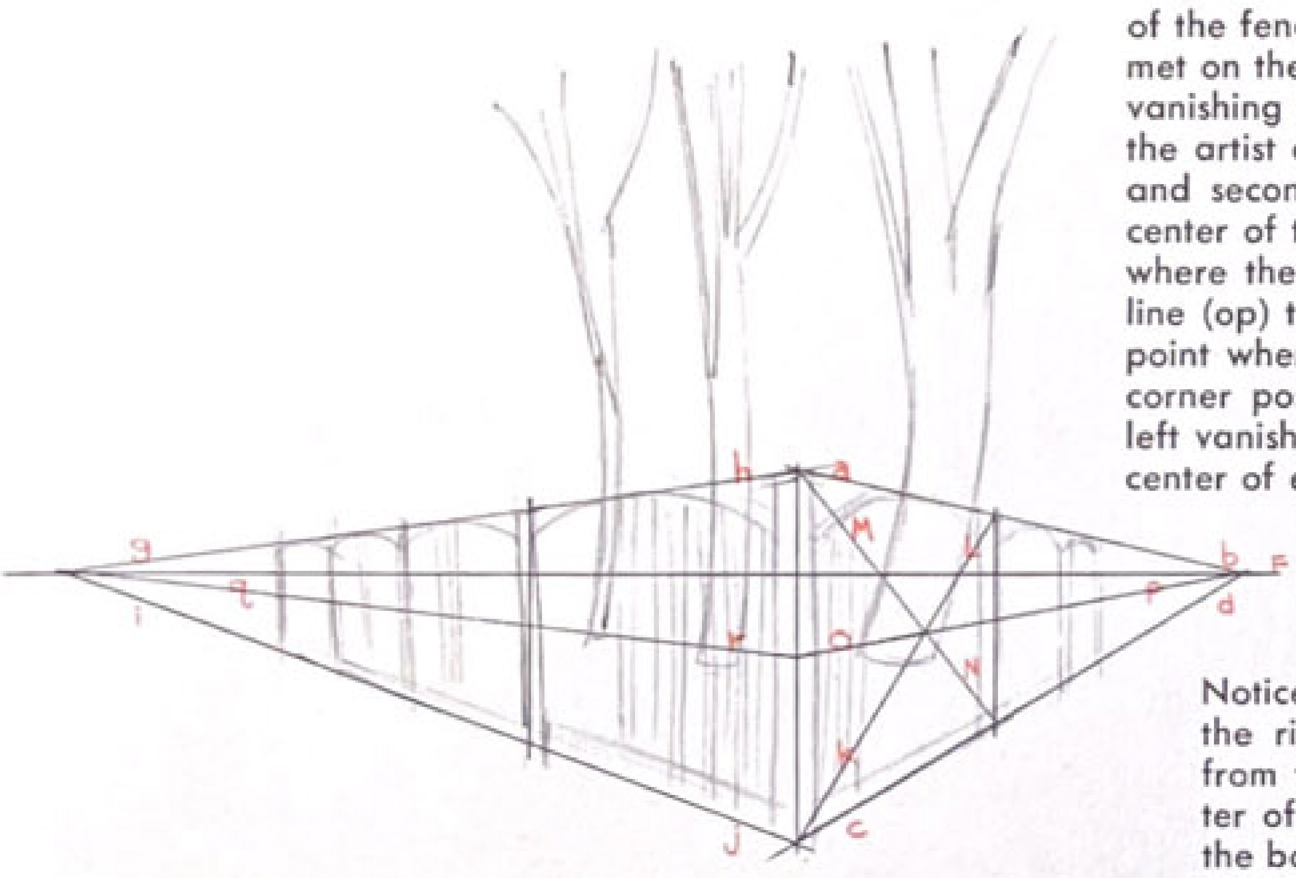
Next, the artist guessed at the horizon line to locate a vanishing point. He then drew a vertical line twice the height of the closest post. Lines were drawn from the top and bottom of this post to the vanishing point. By a careful guess the artist located the second post, and from this he was able to space the rest of the posts following the same methods for spacing the telephone poles. Notice how the artist extended the vertical lines high enough to check the spacing of the poles on the upper curve of the hill. However, he had to guess at the height of the poles. An artist learns to make fairly accurate guesses of this kind by carefully observing many different scenes. If this fence had been curved, instead of being straight, the artist would have had to guess at both the height and the spacing.

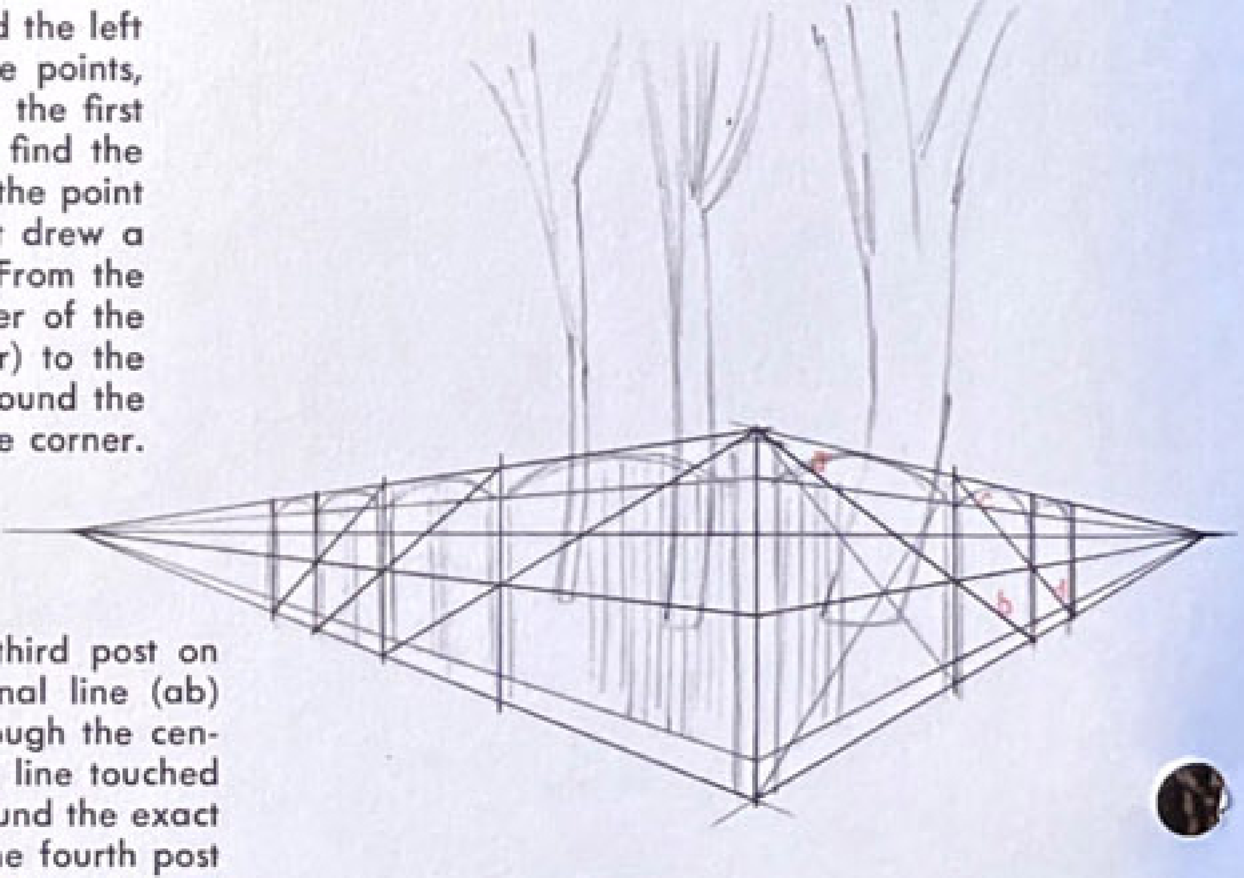
When drawing this scene, the artist had to use two point perspective as well as the dividing and spacing rules. Notice that the corner post appears to be the largest post in the picture. This is because it is the closest one, and the others go off to the side to vanishing points on the left and right. This art was done in pencil and felt tip pen.

First the artist made a sketch of the fence and the trees behind the fence. Just by using his eye he tried to get the correct spacing of the tall vertical posts and the size relationship between them. As you know, finding the placement of the second post is guess work. But, from then on you can use the rule of spacing and dividing to keep this same relationship for the rest of the posts in the picture.



To find the right vanishing point the artist made perspective lines (ab and cd) on the top and bottom of the right side of the fence. Where these lines met, the artist found the vanishing point. Then he drew the horizon line (ef). Next he extended the top and bottom of the left side of the fence (lines gh and ij). Where these lines met on the horizon line, the artist found the left vanishing point. After he located these points, the artist drew diagonal lines between the first and second post lines (kl and mn) to find the center of the space between them. At the point where these diagonals cross, the artist drew a line (op) to the right vanishing point. From the point where this line touched the center of the corner post, the artist drew a line (qr) to the left vanishing point. By doing this he found the center of each post on both sides of the corner.





Notice how the artist found the third post on the right side by drawing diagonal line (ab) from the top of the first post, through the center of the second post. Where the line touched the bottom guide line, the artist found the exact place for the third post. To find the fourth post the artist drew a diagonal line (cd) from the top of the second post through the middle of the third post to the bottom guide line. Next, he used the same procedure to correct the spacing on the vertical posts on the left side of the fence.

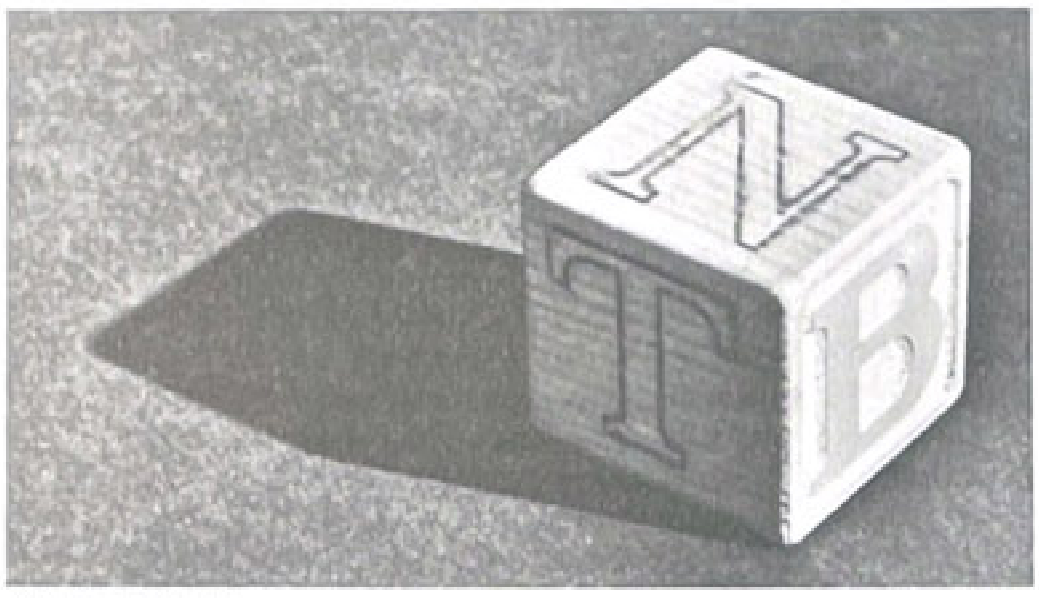
Shadows

All solid objects cast shadows when they are illuminated by a strong light source. And because shadows are so common, you should be able to draw them if you want your artwork to be realistic. Drawing shadows is not just "hit or miss". There are special rules that will help you draw them correctly. And once you learn these rules, you will be able to apply them to all shadows.

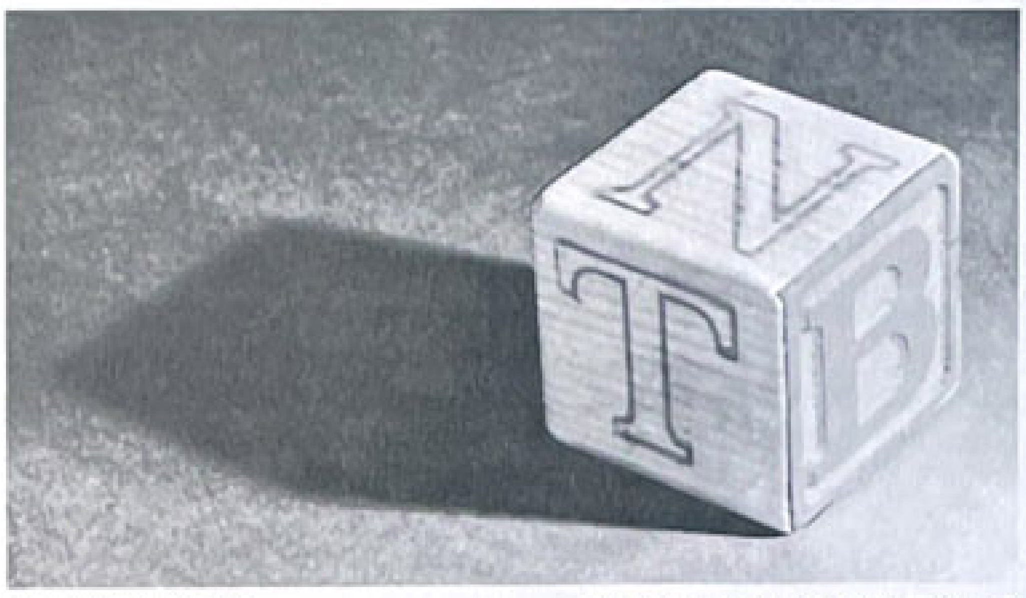
In all your studies, you must remember that there are two types of light: natural light from the sun and artificial or man-made light from electric lamps, spotlights, etc. The type of light that illuminates the objects in your picture will have a dramatic effect on their shadows. Remember this general rule . . . shadows from the natural light of the distant sun have parallel sides; shadows from artificial light fan out and get wider as they run along the ground. You see this principle demonstrated in the two photos of the children's building block. In one, the shadows fan out and in the other the edges of the shadows run side by side in a parallel manner.

WHAT TO DO

You may have some difficulty drawing shadows cast by the natural light of the sun because shadows keep moving as the sun orbits. But, you can work indoors at night, or anytime, if you pull the shades and turn on an electric light. For best results, use only one light. Try drawing a chair. You can follow the demonstration of the table for your chair project.

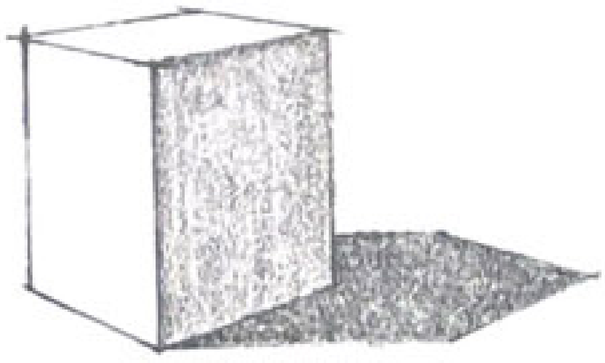


Natural Light

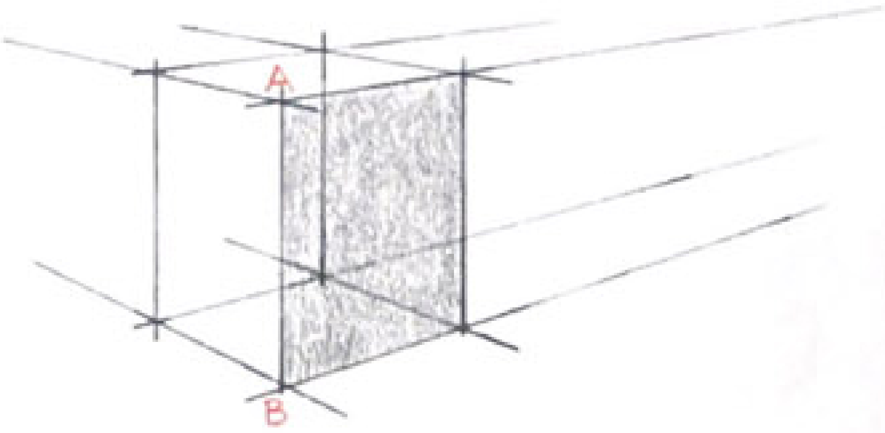


Artificial Light

Photographs by Bob Blanch

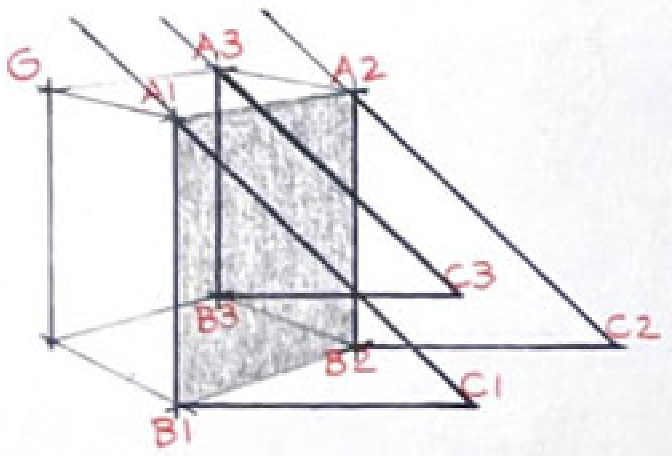


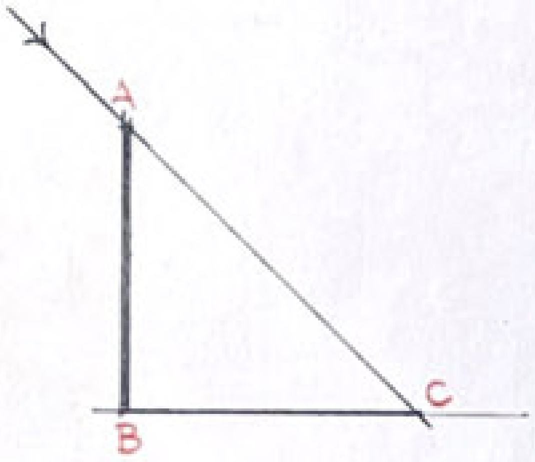
In this demonstration the light was placed so the base lines of the shadow would fall on a straight horizontal to the right of the cube. If the light were shifted, the shadow would move with it. Also, if the cube sat on an uneven surface, the base lines of the shadow would not be straight as they are in this demonstration, but would follow the curves of the uneven surface.



Beginning in sketch number two the artist carefully established all the corners and edges of the cube with two point perspective. You can tell by the shading that the light was coming from above and to the left of the cube.

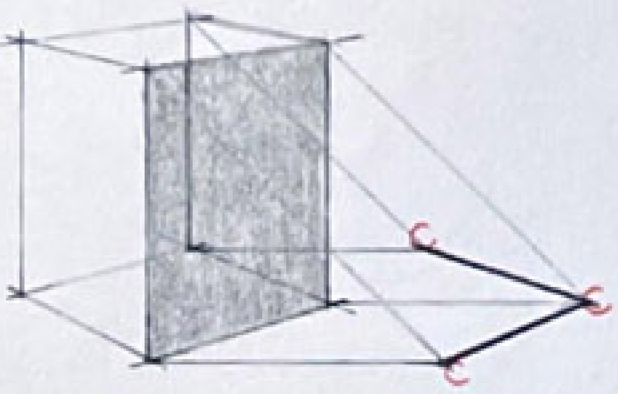
In figure five the artist extended straight lines from the light source so they just touched the top corners of the cube (points A_1, A_2 and A_3) (he did not do this on the upper left corner [point G] because it is in full light and has no shadow). Next he extended horizontal base lines from the three bottom corners of the cube (B_1, B_2 and B_3) to where they crossed the lines from the light source at points C_1, C_2 and C_3.

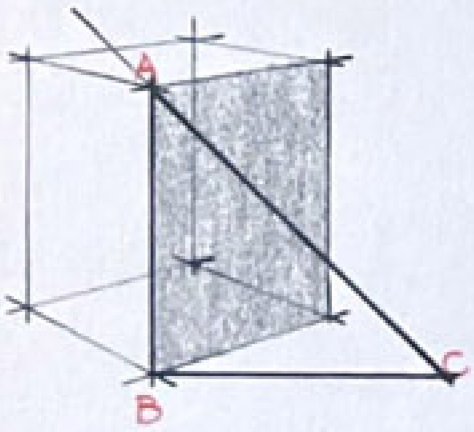




In this diagram, line A B represents the closest edge of the cube. Line A C, (the line with the arrow), is the light coming from the sun. Line A C falls straight from the light source, just touches the top edge of line A B and continues to the ground. At point C the light hits the ground. Line B C is called the base line of the shadow. It is the ground plane on which the shadow falls.

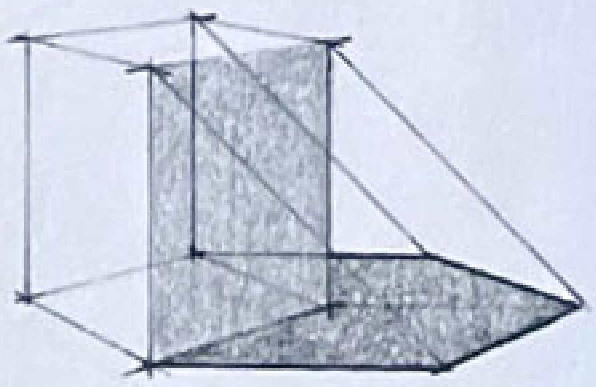
In figure six, lines were drawn on the ground connecting all the C points. This establishes the outline of the cube's shadow.



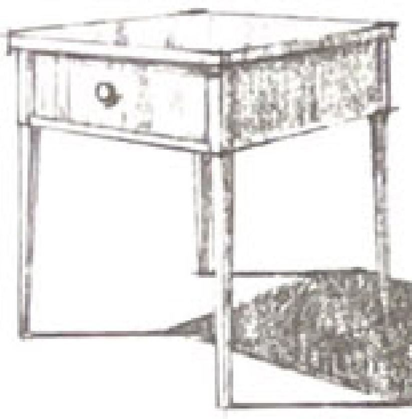


Here again the artist shows the angle of light coming across the top corner of the cube's nearest edge. This is a repeat of the principle in figure number three, only here the complete cube has been included.

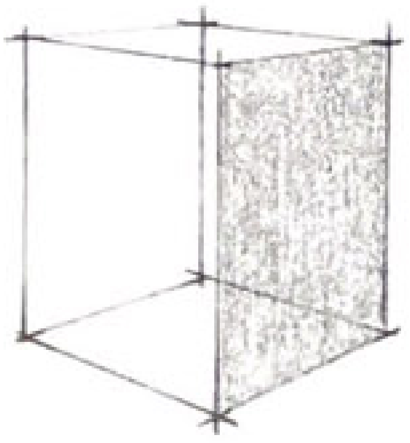
In the final step the artist shaded in the shadow. Remember that the shadow is the result of: first, the shape of the object; second, the direction or angle of the light; and third, the surface on which the shadow falls.



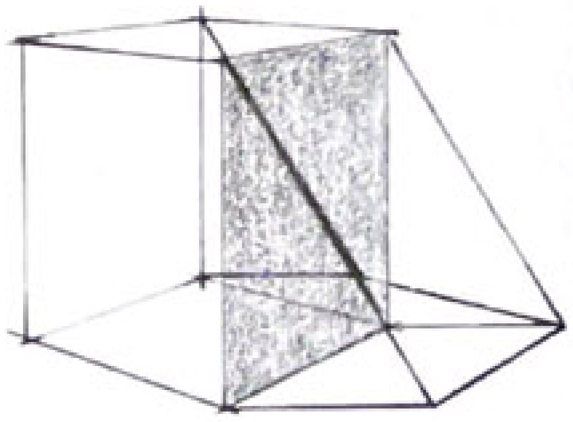
Artwork by George Terp



Now that you understand the shadow cast by a simple cube, let's see how to draw the more complicated shadow of a table. In this demonstration, as in the step-by-step art of the cube the object is lit by the distant light of the sun. This means the base lines of the shadow will lie parallel to each other. Also the light source and object have been carefully arranged so the base lines of the shadows fall on a perfectly flat surface and on a perfectly horizontal line to the right of the object.

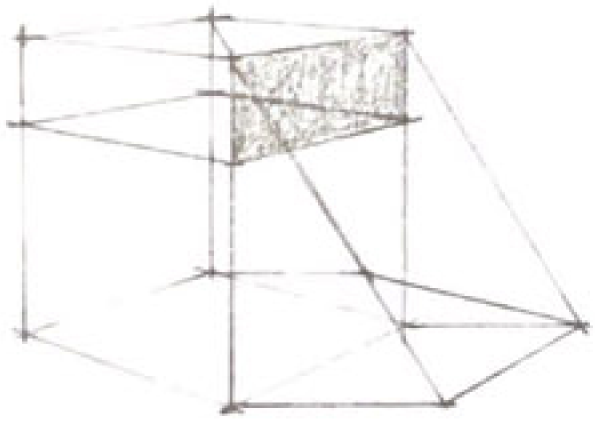


You remember from your study of Form, that a table is basically a cube. So, the artist started in figure two with a form sketch of a cube the same size as the table. This cube is in two point perspective. An artist would not normally shade in this entire side of the cube, but we wanted to show the shadow side of the cube.

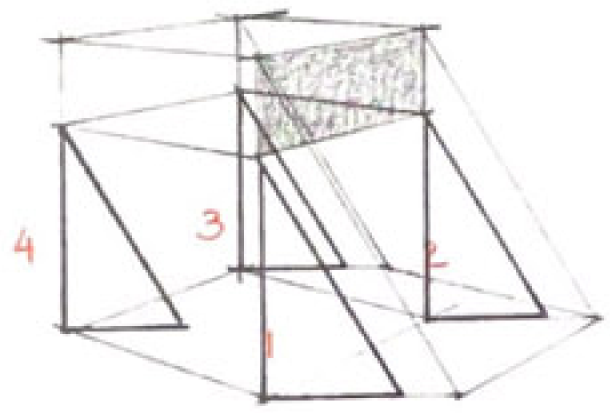


In figure three you should recognize the method of establishing the angle of light and the outline of the shadow. This is the same method used earlier on the simple cube drawing. Extended lines come down from the light source through the top corners of the cube (table) to find the angle of light. The artist then extended base lines from the bottom corners of the cube (table), to the points where they cross the lines from the light source. Next he outlined the shape of the shadow.

Artwork by George Terp



In figure four, he drew lines to divide the cube (table) so we see the solid body of the table and its legs. He also changed the shading to show that the area between the legs is not solid.



Next the artist established the angles of light for each of the table's legs. You will notice that the left leg, number 4, also throws a shadow now. (In the demonstration of the simple cube there was no shadow from this corner because the cube was solid.)

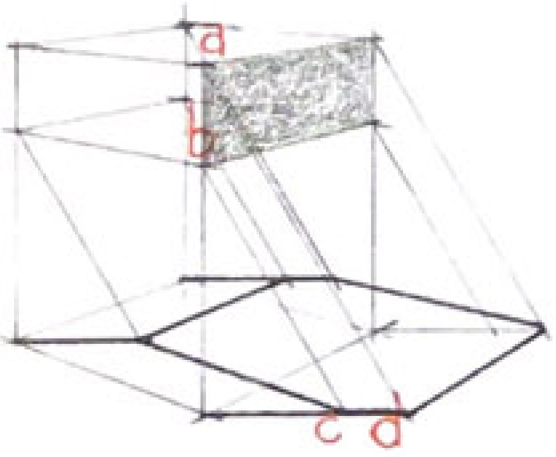
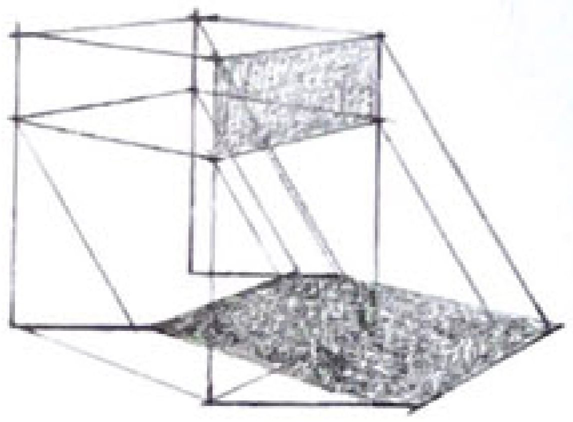
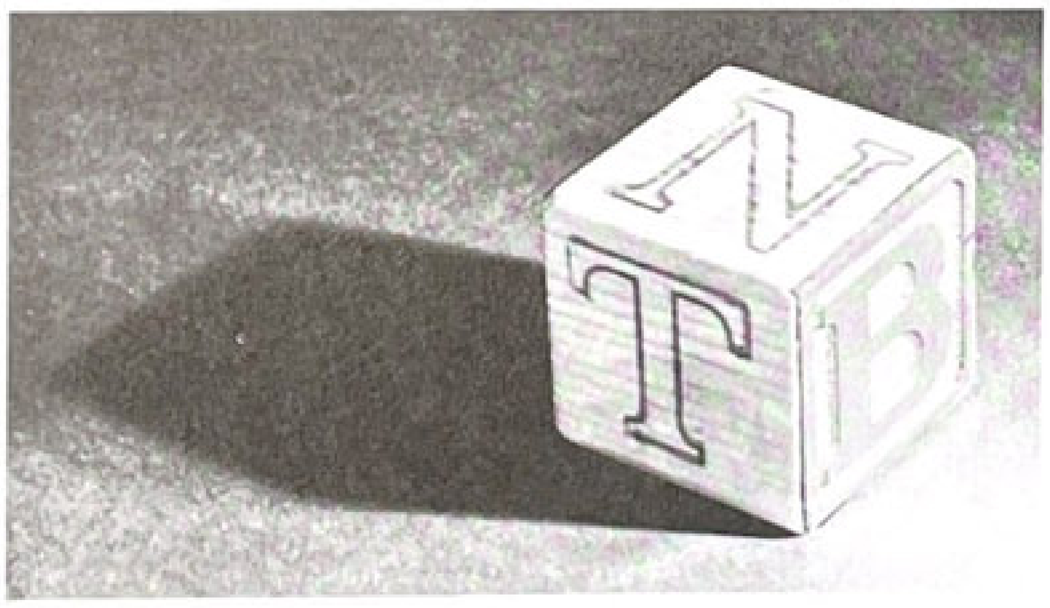


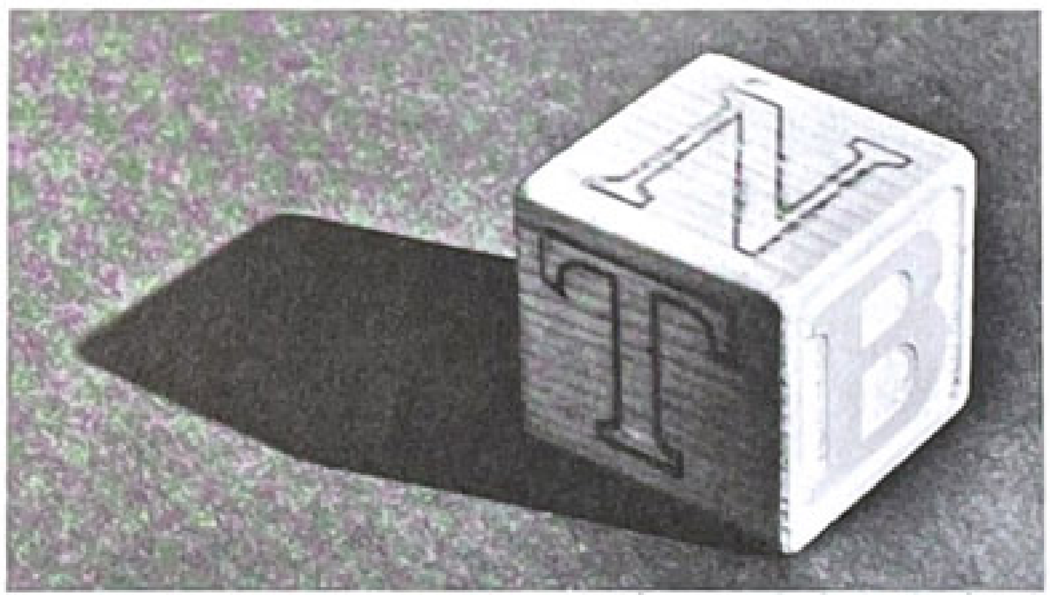
Figure six shows the angles of light connected to make the outline of the shadow. Notice that the shadow area is six sided. The shadow of edge A B shows up at C D. The same thing occurs on the opposite side.



Finally the artist filled in the outline of the shadow from the body of the table and four legs. Remember . . . find the angle of light, connect the outer points where they touch the ground and you have your shadow.

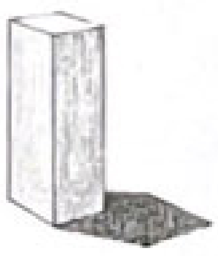


In this photo the shadow gets wider as it moves away from the block. You can tell from this "fanning" that the block was lit by an artificial light held quite close to the block.



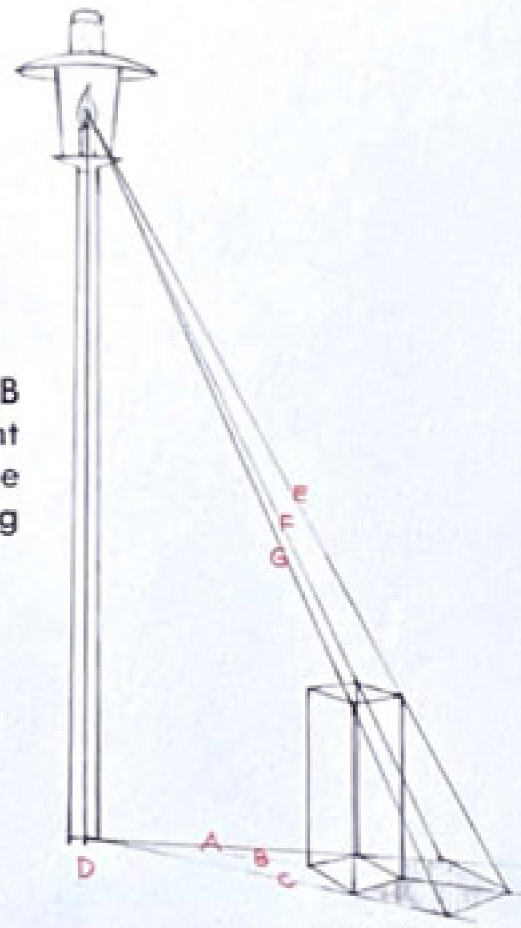
Photographs by Bob Blanch

This block was actually lit by an artificial light but because the light was held at a great distance from the block, it gives the effect of natural sunlight. The edges of this shadow are parallel to each other.

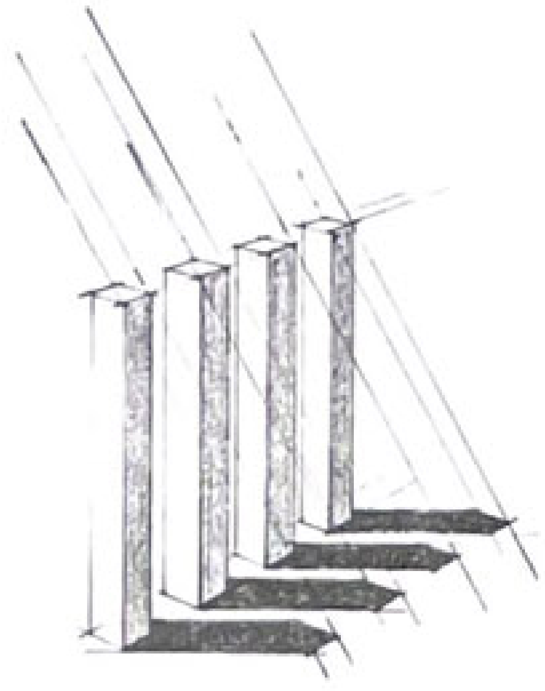


The artist has drawn an oblong box casting a shadow from a nearby artificial light source. Notice how the base lines get farther apart as they move away from the base of the box.

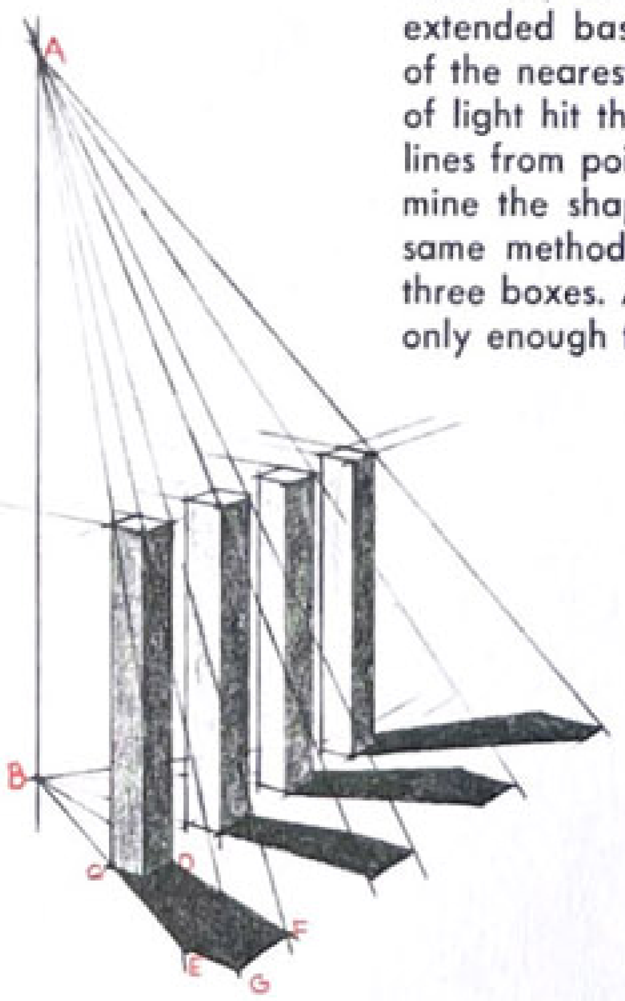
You can easily see how the artist drew his base lines A, B and C from the point where a vertical line from the light struck the ground, point D. The diagonal lines showing the angle of light, E F and G, also are important in constructing the shadow of this box.

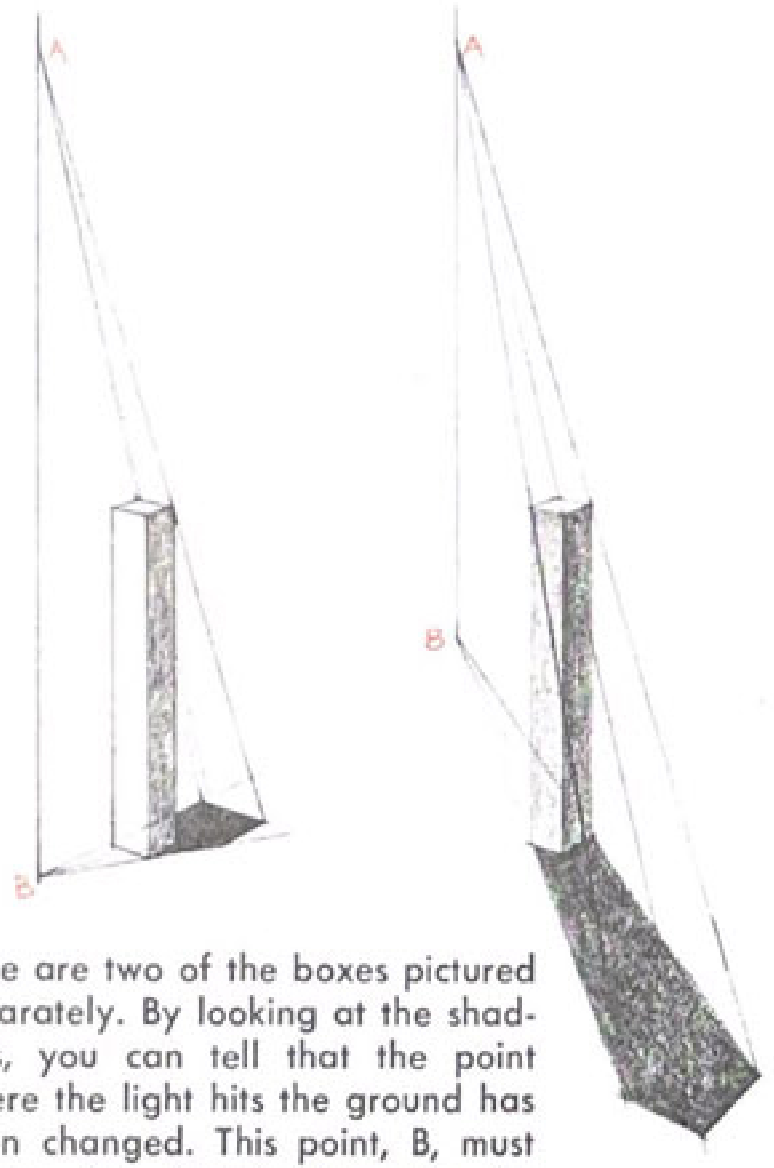


In this drawing of the tall boxes, you can tell that the light comes from a great distance because the base lines are practically parallel. The procedures used in this drawing are the same as those used for drawing the shadows for the cube and table. Notice how the artist drew the angle of light for each box so he could find the point where the light touched the ground. Then, with these points, and the extended base lines, he could draw the outline for each box's shadow.



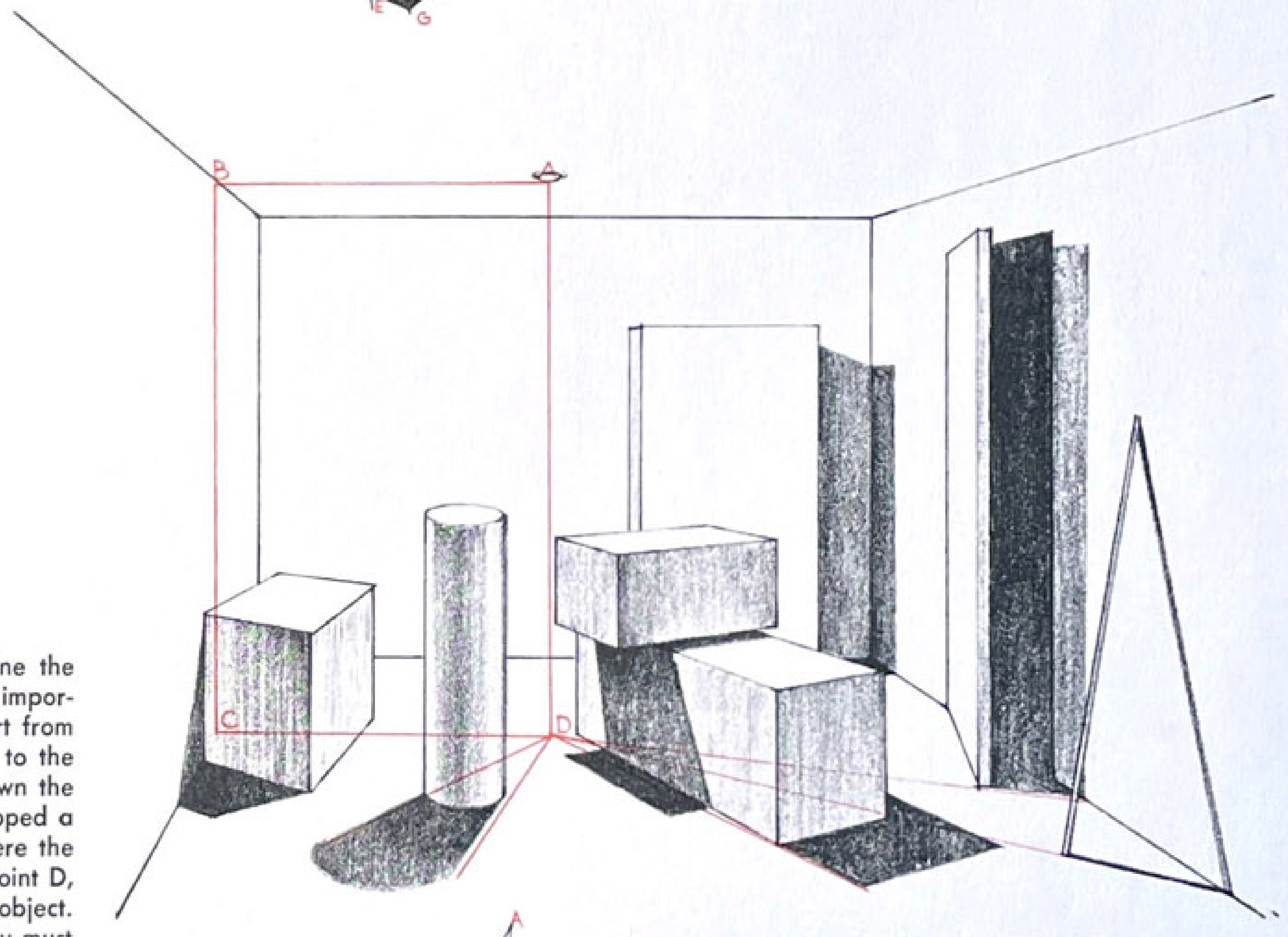
Fanning shadows in this drawing of the four boxes clearly show that the light is close to the boxes. You can also see how the artist dropped a line from the light source (A) to the ground (B). The location of point B is based on the location of the light source in relation to the boxes. The farther forward the light source is, the lower point B will be. From point B, he extended base lines through the corners (C and D) of the nearest box out to the points where the angle of light hit the ground (points E and F). By drawing lines from points E to G and G to F, he could determine the shape of the first box's shadow. With the same method, he found the shadows for the other three boxes. Again, not all lines have been drawn — only enough to help you see the method.





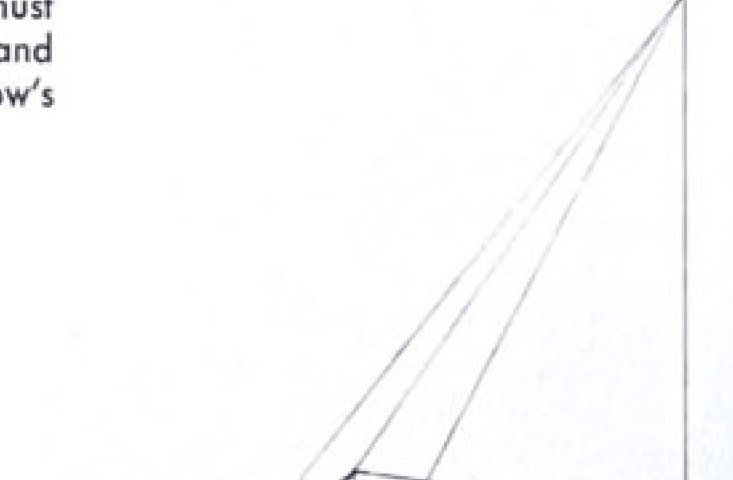
Here are two of the boxes pictured separately. By looking at the shadows, you can tell that the point where the light hits the ground has been changed. This point, B, must always be directly beneath the light, A, but of course, both A and B can be changed with each new drawing. The position of A and B determines the direction of the shadow.

In this drawing the artist's first job was to determine the point directly beneath the light, point D. This is very important because the angle of all the shadows must start from this point. First he drew a line (A B) from the light to the left wall, parallel to the far edge of the ceiling, down the wall (B C), and across the floor (C D). Then he dropped a vertical line from the light (A) to the floor (D). Where the vertical line from the light crosses the floor line, at point D, he located the starting point for base lines to each object. Of course, you know from your studies so far that you must also get the angle of light (lines from the light source) and combine these with the base lines to find each shadow's shape.

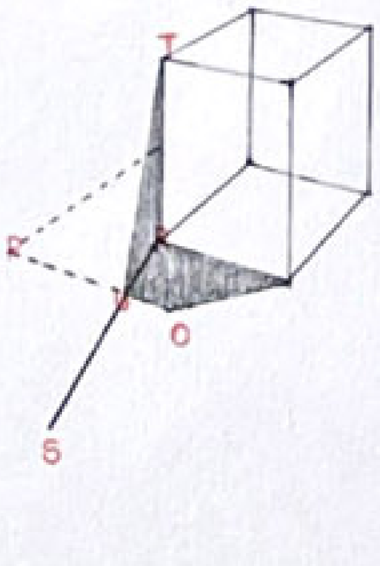


Artwork by George Terp

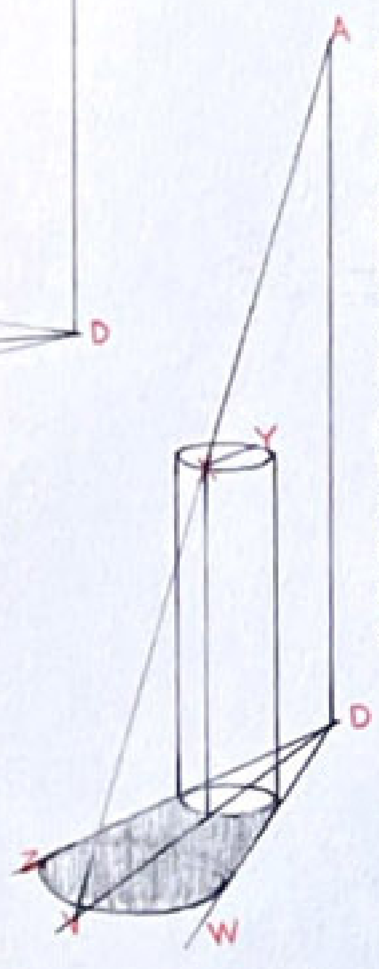
The artist drew each shadow for each object in the room separately, by using the lines showing the angle of light and the base lines from point D beneath the light (A). At first the artist disregarded the wall when he constructed this shadow.



Here the artist corrected the shadow to allow for the wall. The dotted lines show where the shadow would fall if there were no wall. Since the edge of the box is touching the wall, the artist knew that the top of the shadow on the wall would start at the upper left corner of the box (T). The bottom of the shadow on the wall must meet the shadow on the floor. So, the artist located this point (U) at the spot where the shadow edge (O P) on the floor met the line S R which is the line where the floor and the wall meet. A diagonal line drawn from T to U shows the edge of the box's shadow on the wall.



Drawing the shadow of a cylinder is simple, even though the cylinder has no corners. You first locate the diameter of the cylinder in respect to the light (line X Y). Then draw your line down from the light (line A V) through the point X, where the diameter cuts the circumference of the cylinder. Where this meets the base line, at V, you start to sketch the half-elliptical outline of the shadow. As in previous shadow drawings, base lines D W and D Z show the sides of the shadow area.



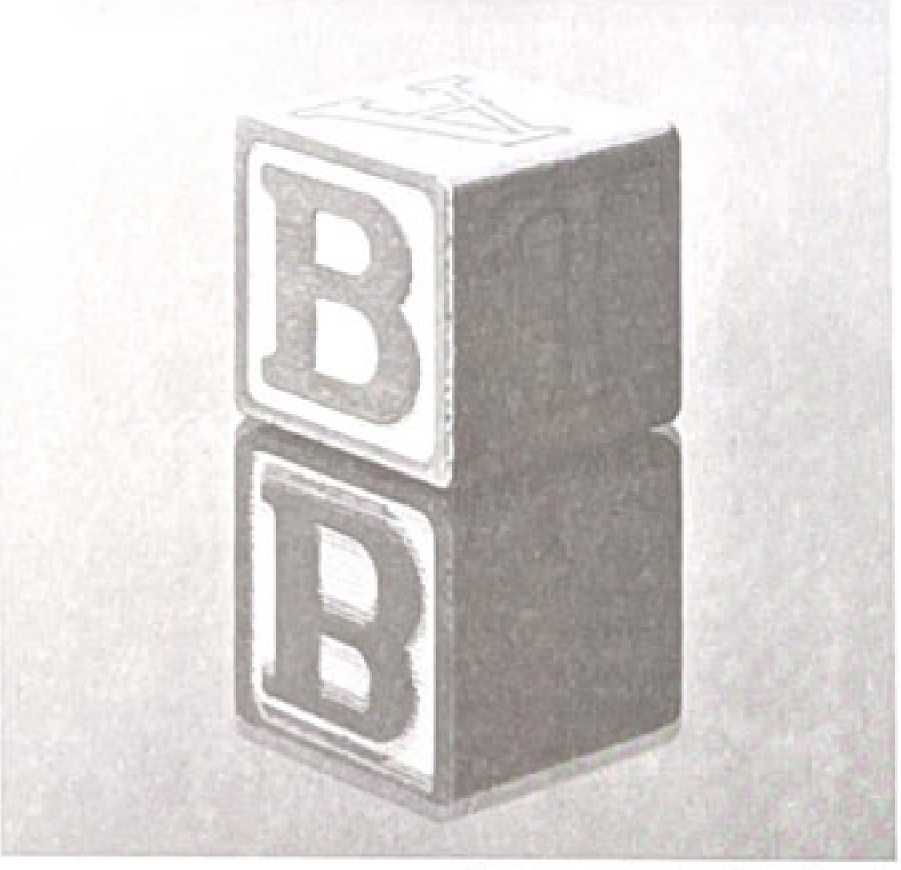
Reflections

When you understand the principles of perspective, drawing reflections is not difficult. In fact, you use the same principles for drawing the reflection of an object that you use for drawing the object itself. You can easily practice drawing reflections by using a mirror. Place a mirror on a table, put an object on top of the mirror, and draw what you see. The mirror will give the same kind of reflection that you would see in still water.

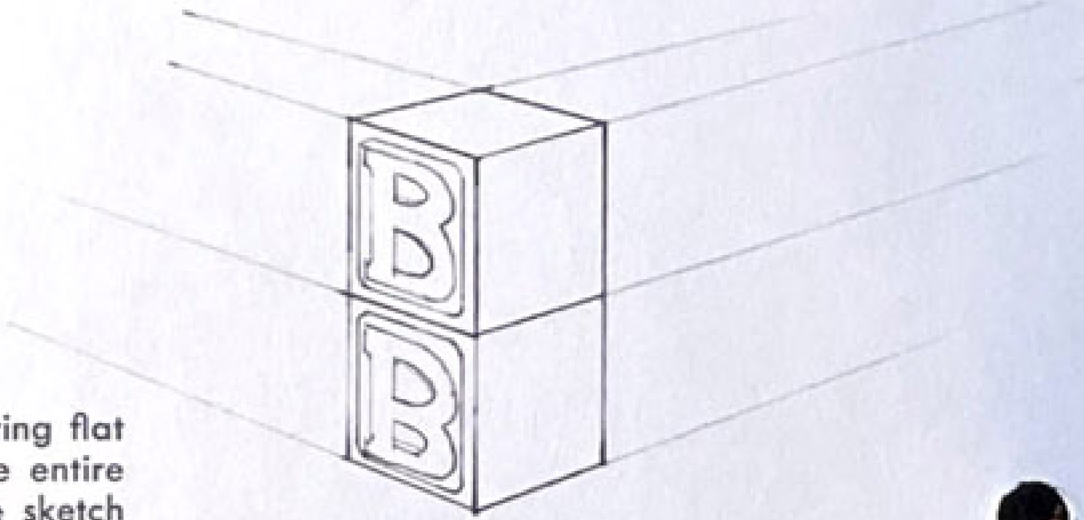
The most important thing to remember when you draw reflections is: all of the points in a reflection are the *same distance below* the reflecting surface as the same points of the object are *above* the reflecting surface. For example, if the top of a window in a house is eight feet above the water surface, the reflection of the top of the window will appear to be eight feet *below* the water surface. This same principle holds true for *all* reflections, whether reflected in water, in a mirror, or in a windowpane at night.

WHAT TO DO

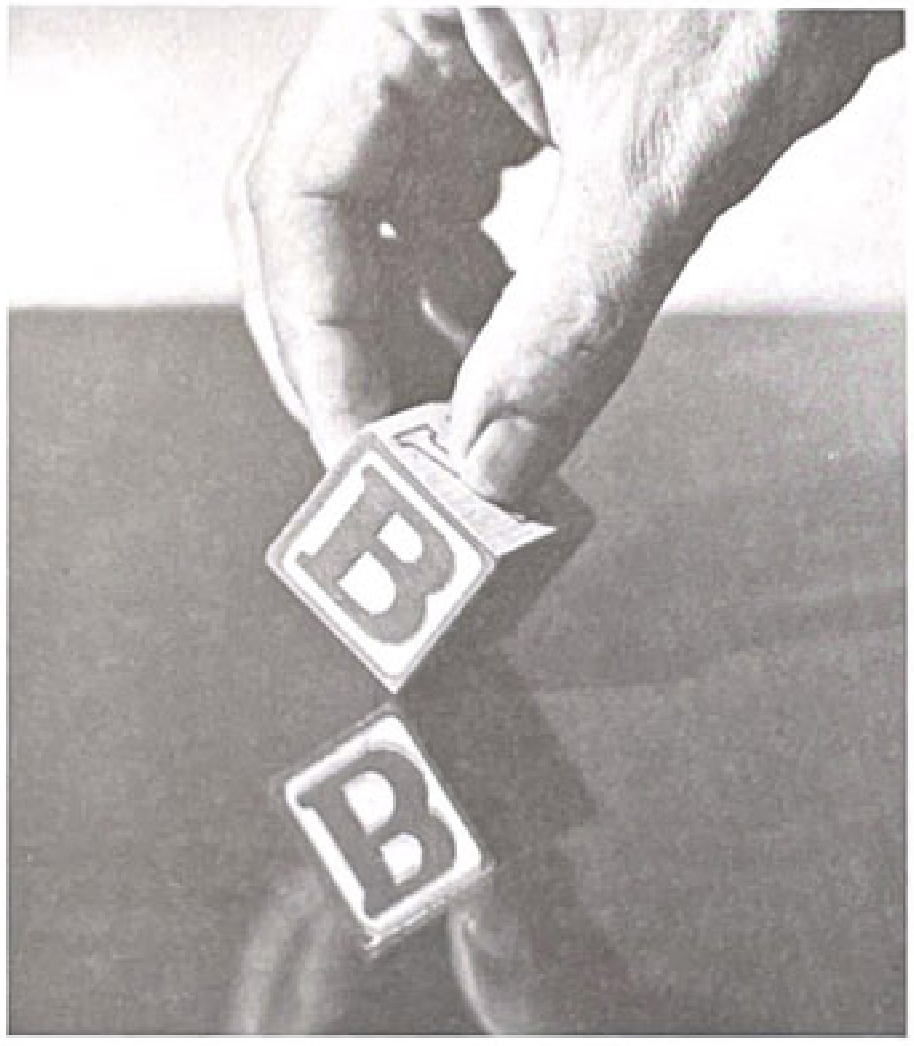
Take a mirror off the wall and lay it on your drawing table. Put your ink bottle or a tempera jar on the mirror and draw both the object and its reflection. If you feel really ambitious, try something more complicated like a little statue or other irregular shaped object.



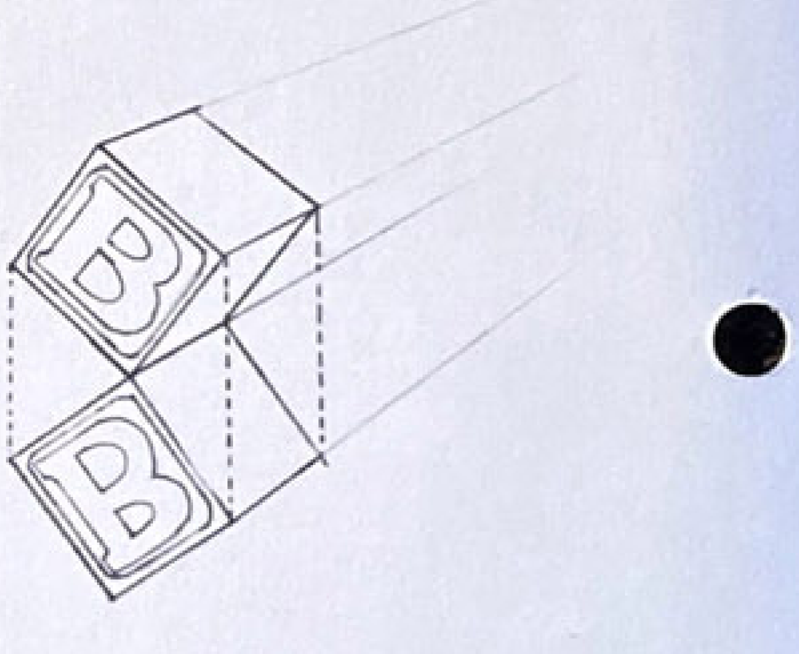
Photographs by Bob Blanch

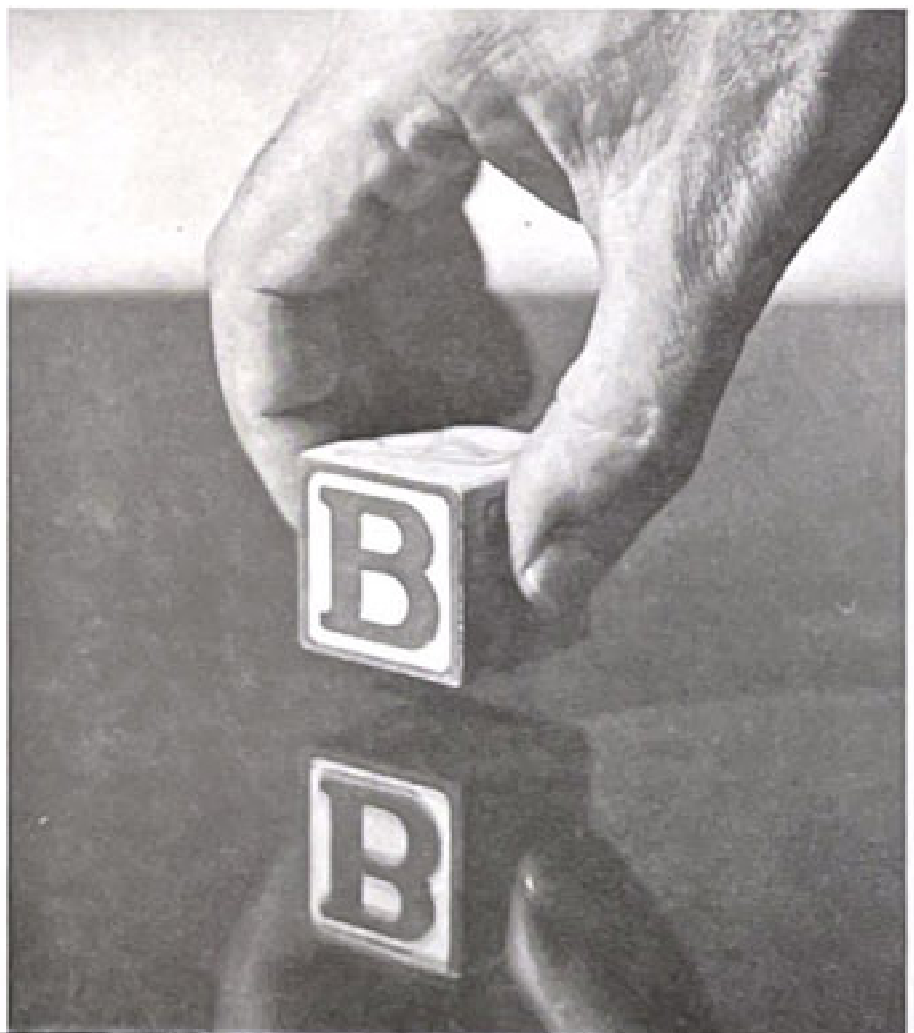


Compare the photo of the children's block resting flat on the mirror with the drawing. In both, the entire block is visible. The perspective lines on the sketch show you that the block and the block's reflection have the same vanishing points. Use your ruler to measure the height of the real block. Then, measure from the reflecting surface where the bottom of the real block sits on the glass down to the edge of the reflected block. The reflected block is the same size as the real block.

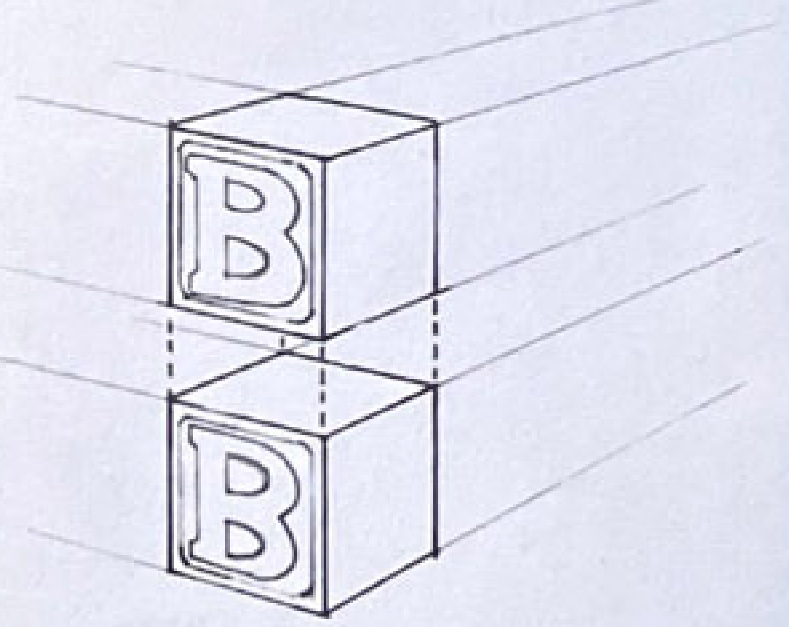


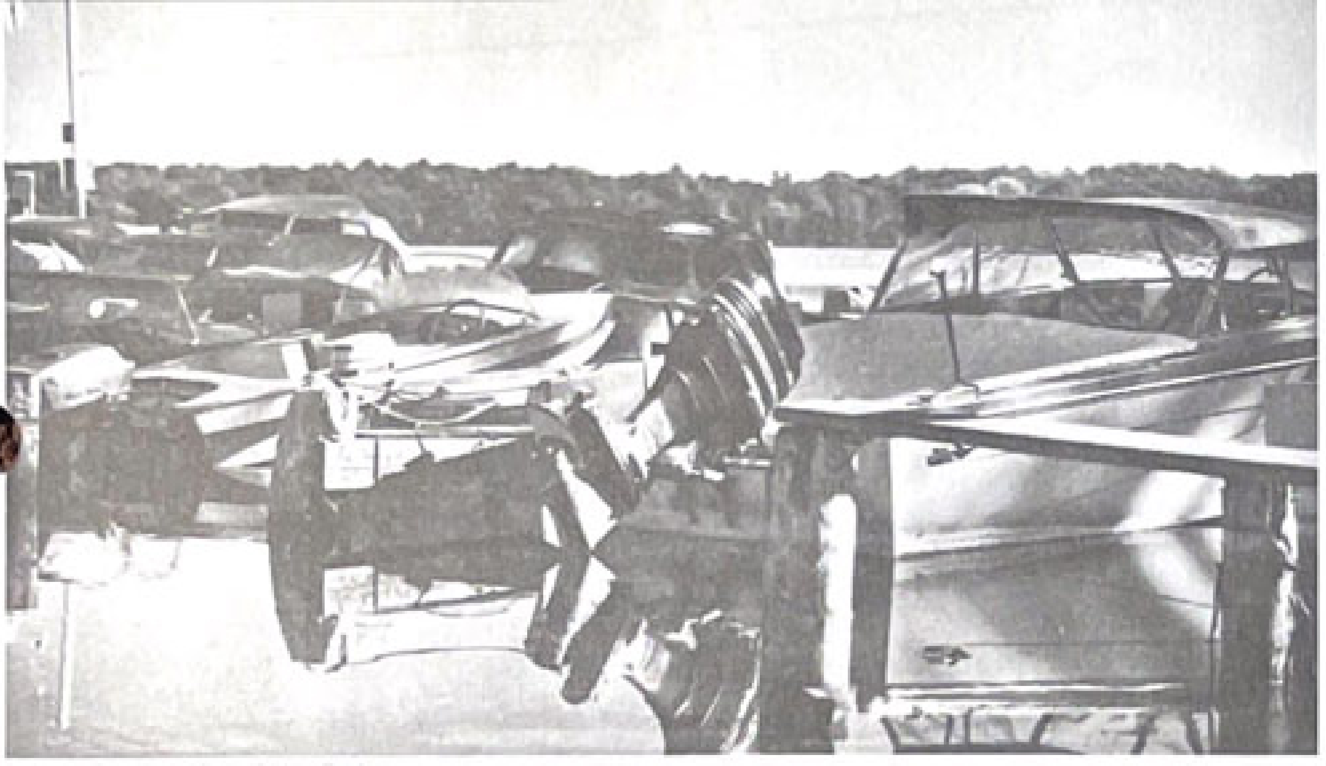
Notice what happens when an object is tilted on a reflecting surface. The reflection tilts in the same direction as the real object. In this photo the real block and its reflection tilt to the right. The artist drew dotted lines on the sketch (vertical lines) showing that the reflected points are directly below the real ones. Also notice that the real block and the reflected block have the same vanishing points.



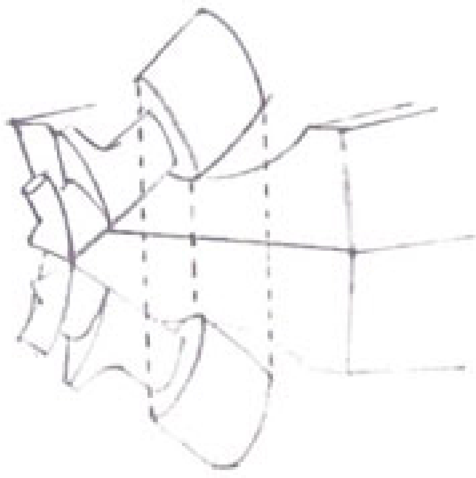


When you draw an object that is raised above the reflecting surface, the bottom of the real object also shows in the reflection. Here the reflection goes as far "into" the reflecting surface as the block is raised above it. You see another example of this when you look at yourself in a mirror. If you move away from the mirror, your reflected image seems to move deeper into the mirror.

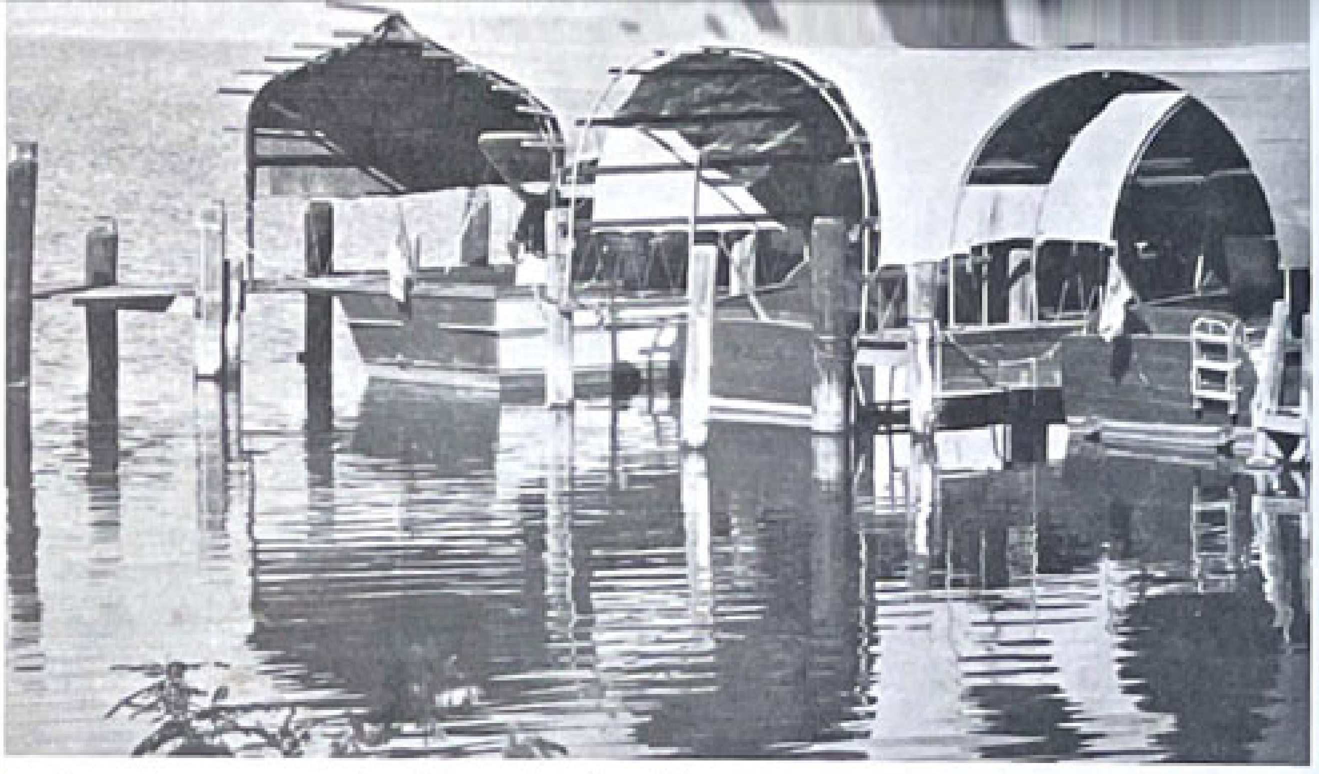




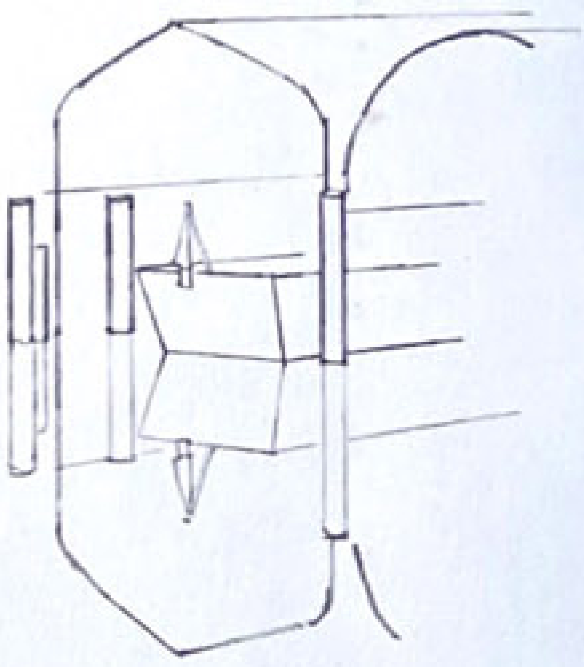
Photograph by Eric Spitz



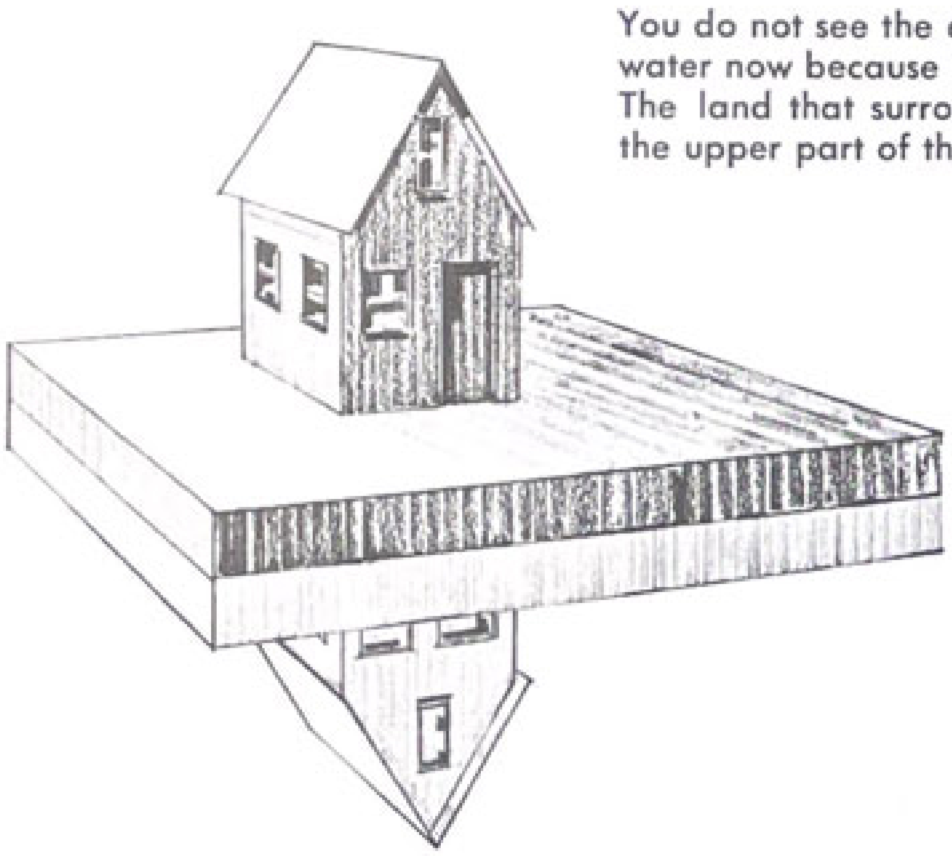
Study the reflections in the water. Because the water is perfectly calm, the reflection of the boats and motors are almost as clear as they would be in a mirror. Compare the photo to the sketch. Notice that the artist used vertical dotted lines for all of the main points of the reflected motor.



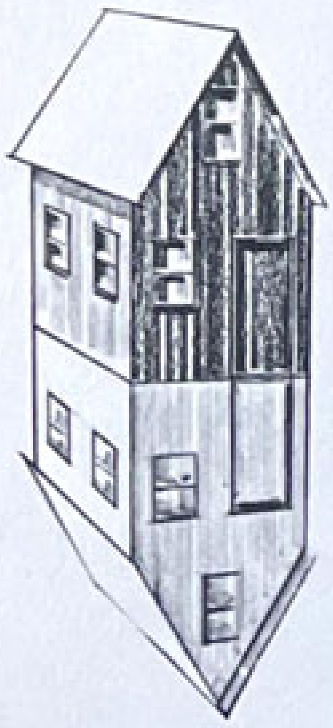
In the diagram of the boats in the "boat houses," the artist made the reflections clearer. Measure the distance from the water surface to the top of the "real boat house" in the drawing. Then, measure the distance from the reflecting surface to the top of the reflected boat house. Notice that the distance is the same in both.



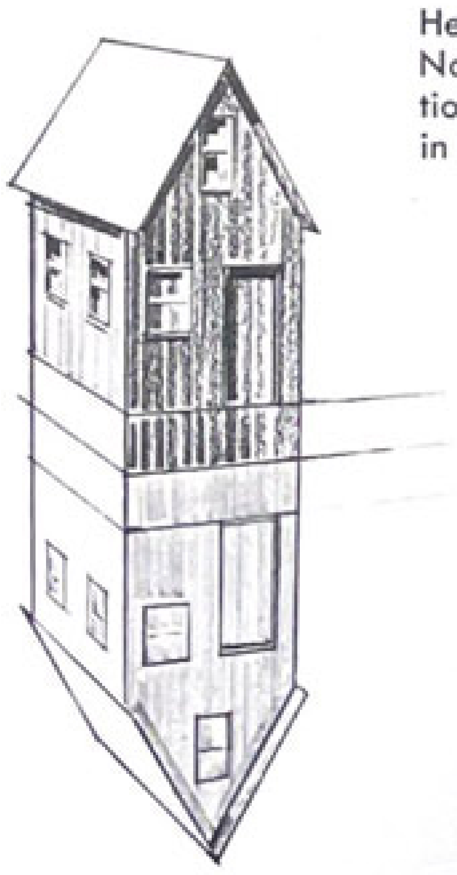
You do not see the entire house reflected in the water now because it is not at the water's edge. The land that surrounds the house allows only the upper part of the house to be reflected.



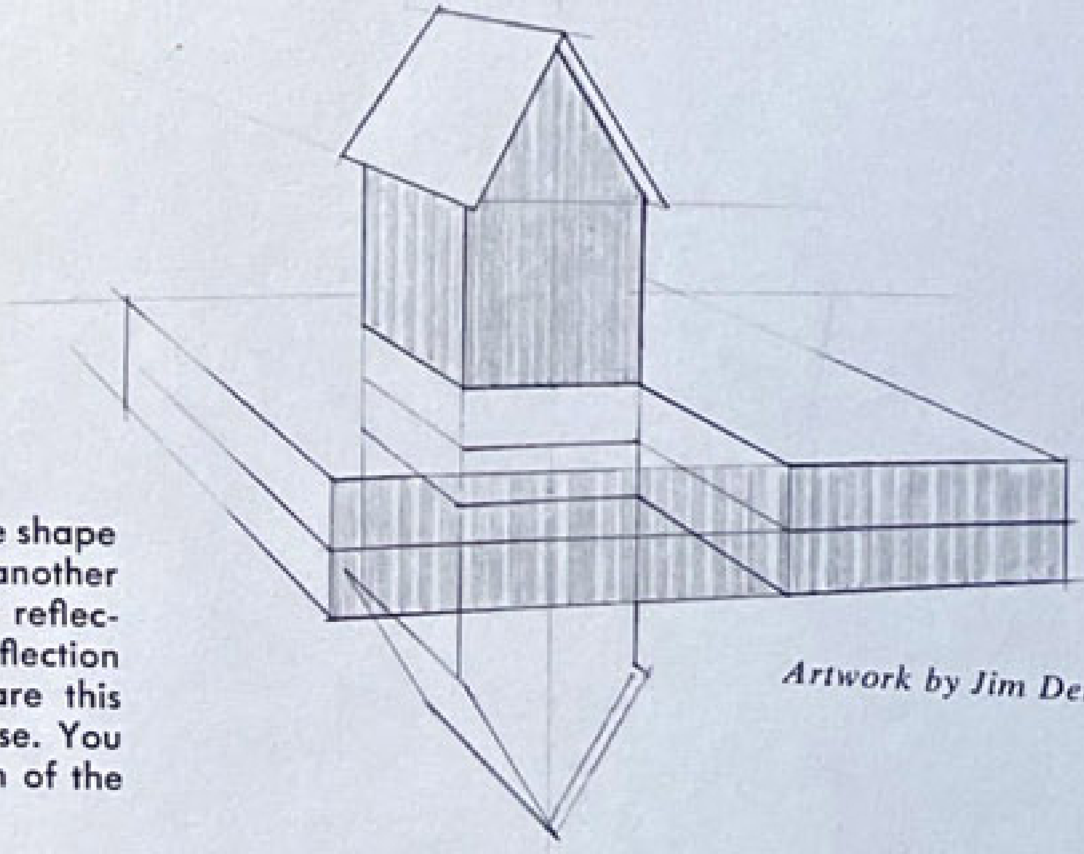
This is a drawing of the same house that was on the land, only now the house is sitting directly on the water. You can see the complete reflection of the house here. Measure the distance from the water surface up to the front peak of the roof. Then, make this same measurement in the reflection—they are identical—the reflection is always the same as the real object.



Here the house is sitting at the very edge of the water. Notice that you can see the entire house in the reflection now. You can also see the reflection of the land in the water.



With this see-through drawing in the same shape as the land in the first example, you get another illustration of the "how" and "why" of reflections. Here you can see the complete reflection of the house through the land. Compare this drawing to the first drawing of the house. You can now see why the complete reflection of the house didn't show the first time.



Artwork by Jim Deneen

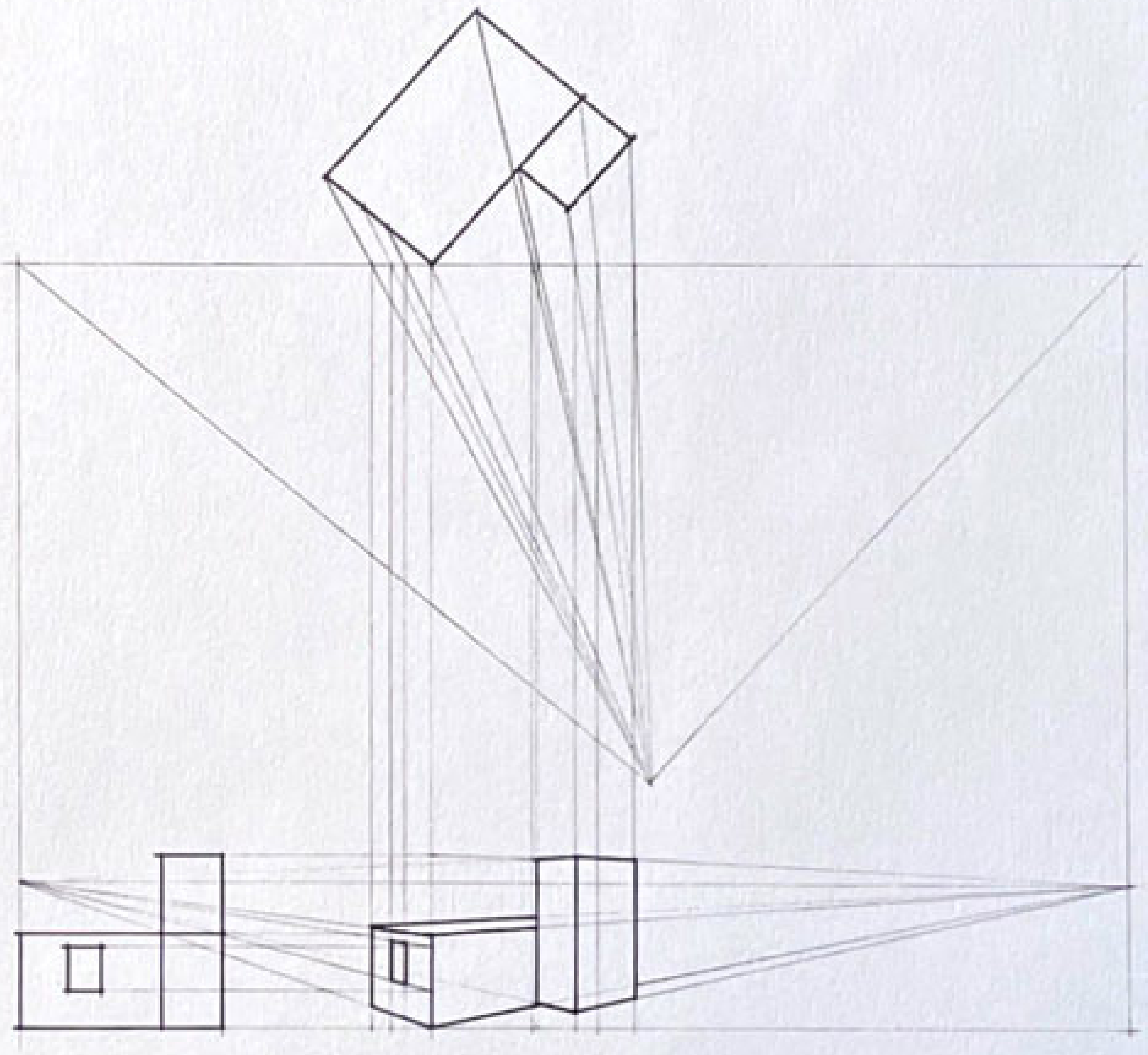
Plan Projection

So far you've been using "freehand" perspective – you've been more concerned with the appearances of objects than with their actual measurements. But you don't have to start with a freehand sketch that just resembles an object. If you have an object's measurements (height, width, length), you can use mechanical perspective to draw that object in perspective. An object drawn with mechanical perspective (more correctly termed "plan projection") not only looks like the object, it is also in perfect proportion with the object. This type of drawing is used continuously in industrial design and architecture. However, any artist who wants a sound training should also feel comfortable using this technique of perspective drawing.

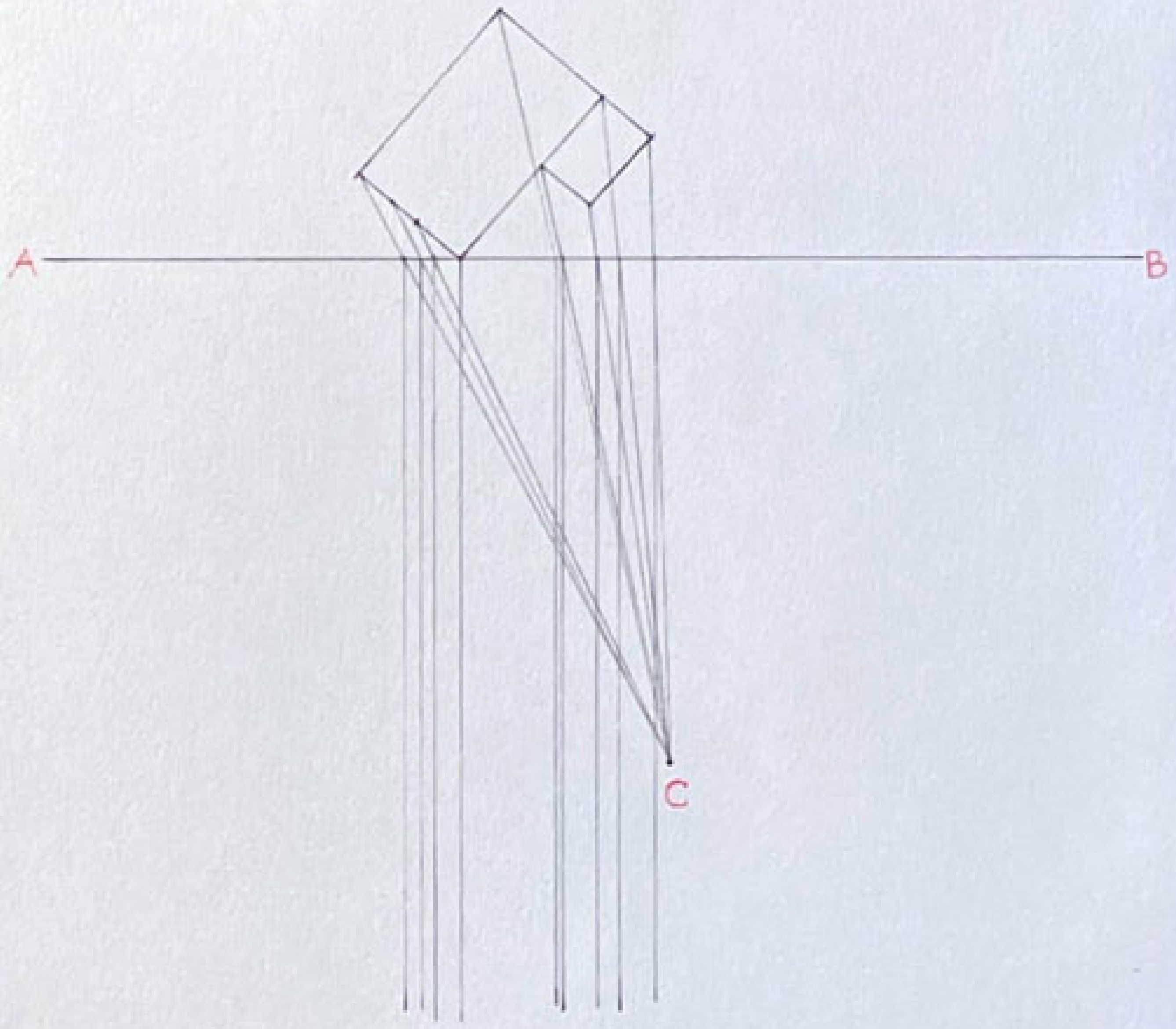
WHAT TO DO

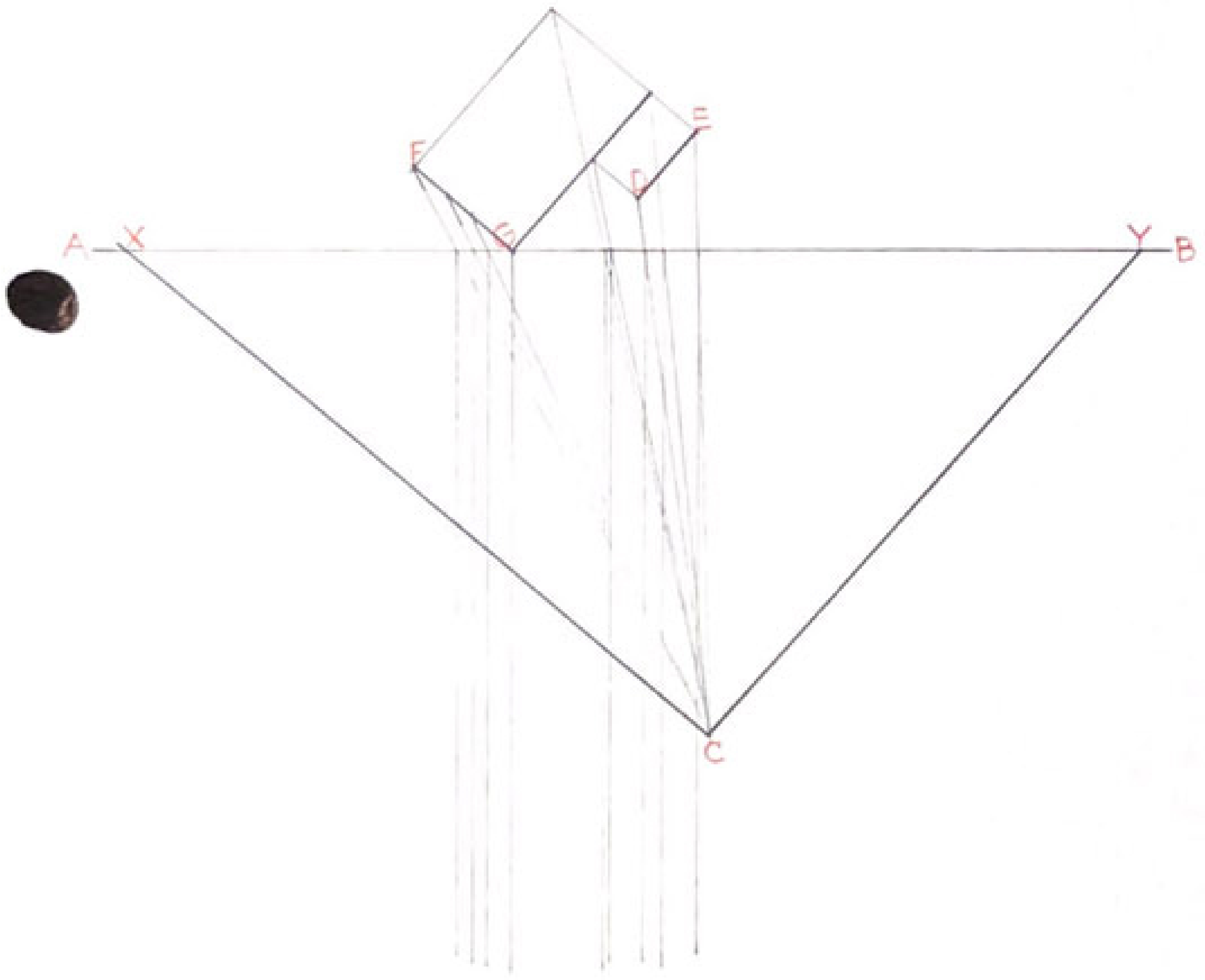
Have you ever thought of the grand studio you would build if money were no problem? Well, right now what's stopping you from making the floor plan for this magnificent palace? And when you decide on the measurements, project the floor plan so you can draw some elevation views. This is practice you'll enjoy!

This is an example of a completed plan projection drawing. Notice that the artist was able to construct the perspective drawing of the building from the "top view" plan. Architects, and artists who design their own homes and studios, use this method of drawing. This enables them to see how the finished building will look. For plan projection drawings you need a carefully drawn top view plan (floor plan or blueprint), and a side view elevation based on the measurements of this plan.

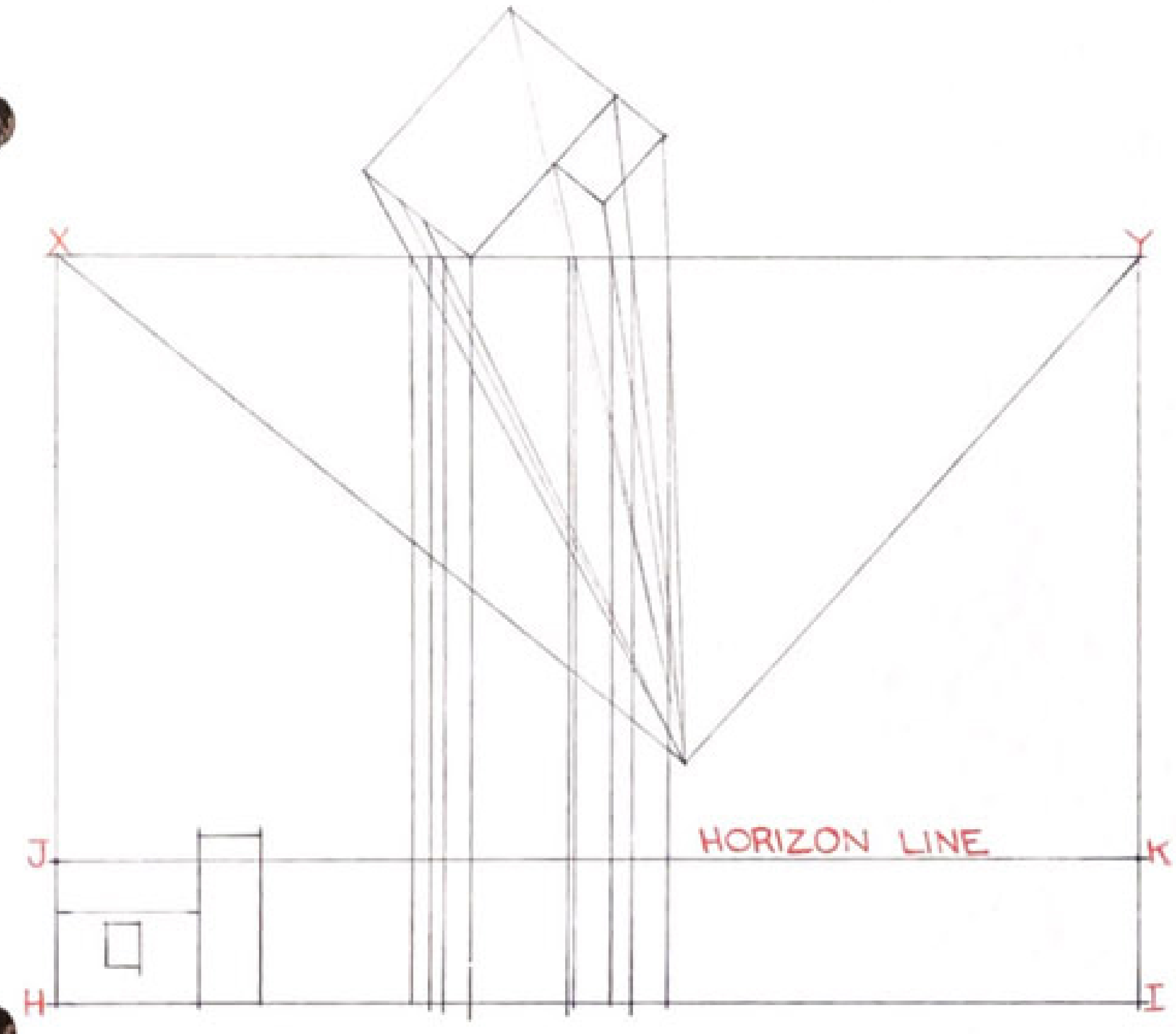


The artist first drew a horizontal line near the top of his paper. This line, A B, is the picture plane line for the floor plan. Next, the artist drew the floor plan at an angle (any angle) to this line and let one corner of the plan touch the line. He then arbitrarily located the station point, C, which can be located anywhere below the picture plane line. The station point is the place from which the artist views the building. If the artist wanted a different view he would move the station point closer or farther from the building, or to the left or right of the building (floor plan). After locating C, he extended guide lines from all of the important points on the plan to this station point. Where these diagonal lines cross the picture plane line, the artist dropped straight vertical lines to the bottom of his paper.



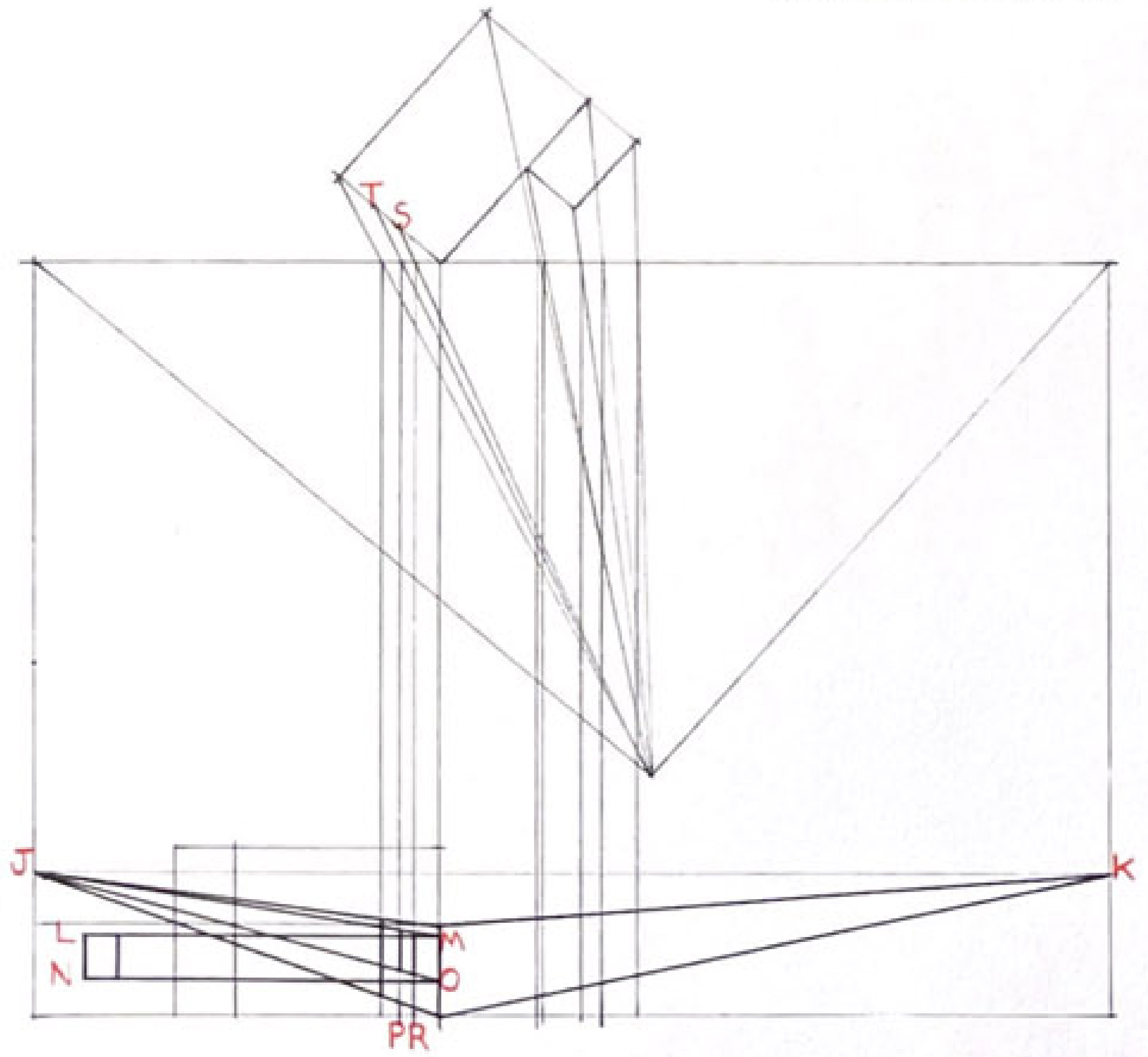


In the next step the artist put in two vanishing points, X and Y, on each end of the picture plane line. He found these by drawing lines from the station point C to the picture plane line. These lines, C X and C Y must always be parallel to the sides of the plan: line D E and C Y are parallel as are F G and X C.



In this step the artist dropped the vanishing points X and Y by using vertical lines H X and I Y. Then he added a horizontal ground line between H and I. He also drew another horizontal line, J K, between the picture plane line and the ground line. This line, J K, will be the horizon line for the perspective drawing of the house. The placement of both the ground line and the horizon line are a free choice of the artist. When drawing these, however, remember that the space between them will influence the angles on the perspective of the building. The further the horizon line is from the ground line the more angular the building will appear. Note that the artist also included his side view elevation here so that he can use it to get measurements in the next stage of his drawing. This elevation drawing has exactly the same proportions (measurements) as the floor plan.

Artwork by George Terp

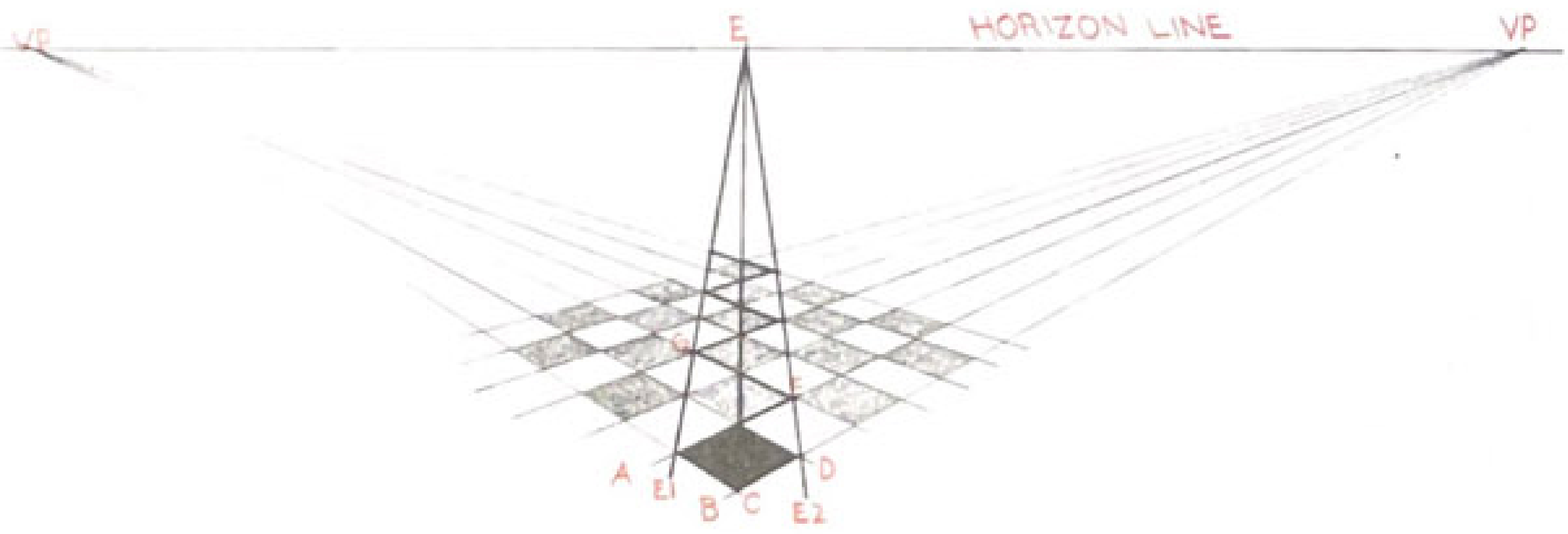


To finish the perspective view of the building the artist had to bring the important height measurements from the side view elevation to the place where these same details are projected down from the top view plan. Where the horizontal lines from the side elevation intersect the vertical lines from the top view plan, the artist drew perspective lines to the horizon and finished his art. Following the idea of always drawing from simple to complex, the artist would draw the large shapes of the building first and add the details, such as the window, last. However, because of its importance to the perspective drawing, we want to concentrate on how the size of the window was established.

First the top and bottom window measurements were extended from the side view elevation to the front corner of the building. These window measurements are lines L M and N O. Next the artist placed these measurements in perspective by drawing perspective lines from points M and O, on the front corner of the building to point J on the horizon. After this he followed the window measurements on the plan, the space between T and S, down to the bottom of the building at P and R. Where the floor plan measurement lines P T and R S intersect the side view measurements on the perspective lines, he finished the window.

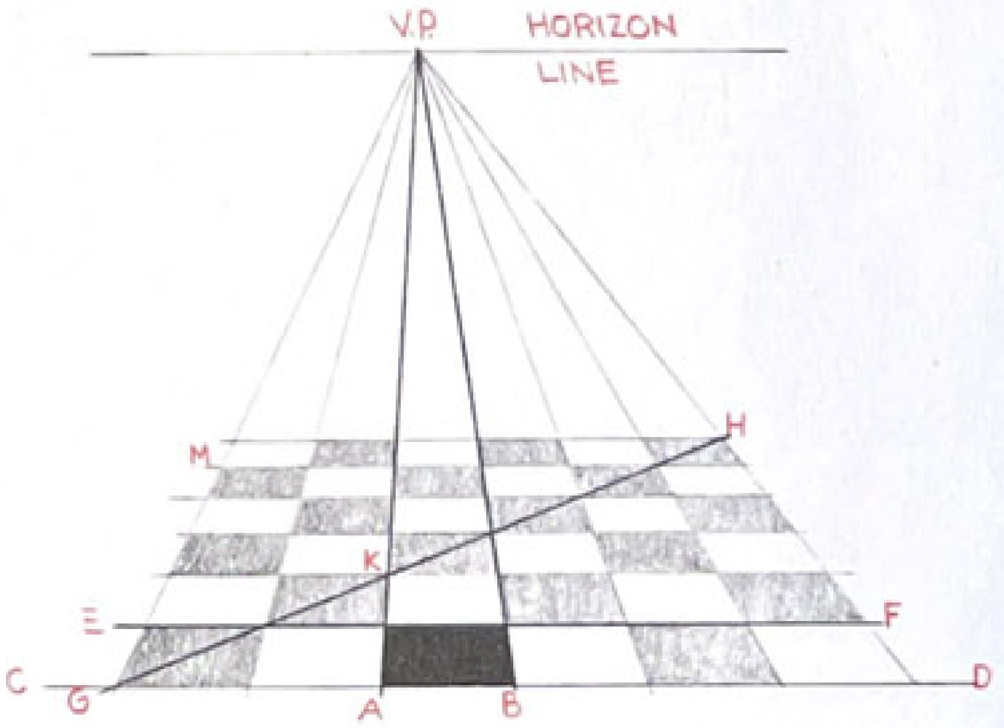
Special Hints

Thus far you have studied the most frequently used principles of perspective. If you have mastered multiple vanishing points, dividing and spacing, ellipses, etc., you will be able to handle almost any type of perspective drawing. However, there are a few concepts that still need to be explained. These are not any more difficult than the subjects you nave covered, it is just that they are unique and not used quite as often as some of the other subjects covered in this lesson. Look over this page to become familiar with these drawings. You'll see that the concepts taught earlier are also the basis for solving these special projects.



When you draw a tile floor in two point perspective, so the tiles resemble diamond shapes, sketch in the proportions of the first tile (the darkest tile). Then extend lines A and B until they converge. Where they come together is the right vanishing point. Next draw the horizon line. You then extend lines C and D and they should come together on the horizon forming the left vanishing point. Next, divide the tile in half, front to back, and extend this line to a third point on the horizon line, point E. From E drop two lines, E-1 and E-2, so they just touch the right and left corners of the tile. Now at point F, where line A touches Line E-2, draw a line to the left vanishing point. Where this line cuts through E-1, point G, start another line in the direction of the right vanishing point. Continue this zig-zag pattern to the right and left vanishing points, and down to the bottom area of the floor and you have the complete floor pattern.

You may find, in a large drawing, that the tiles near the bottom of the floor distort from diamond shapes to rectangle shapes. This can be partially corrected by making a new drawing where point E is raised up above the horizon line. Except for the new placement of E, you follow the same method as just described.

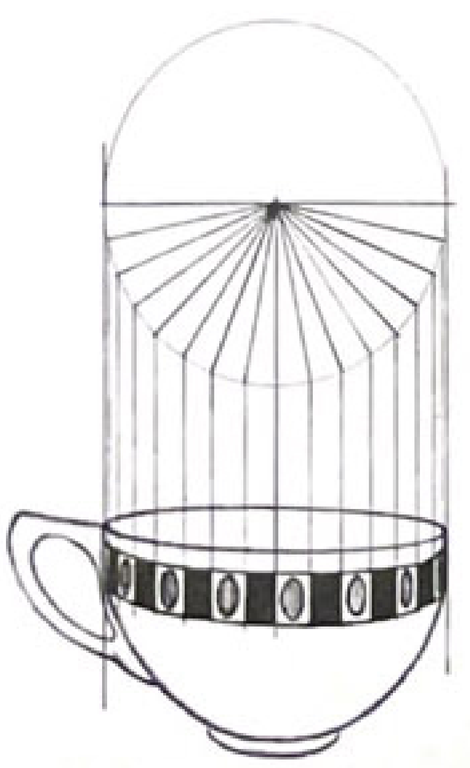


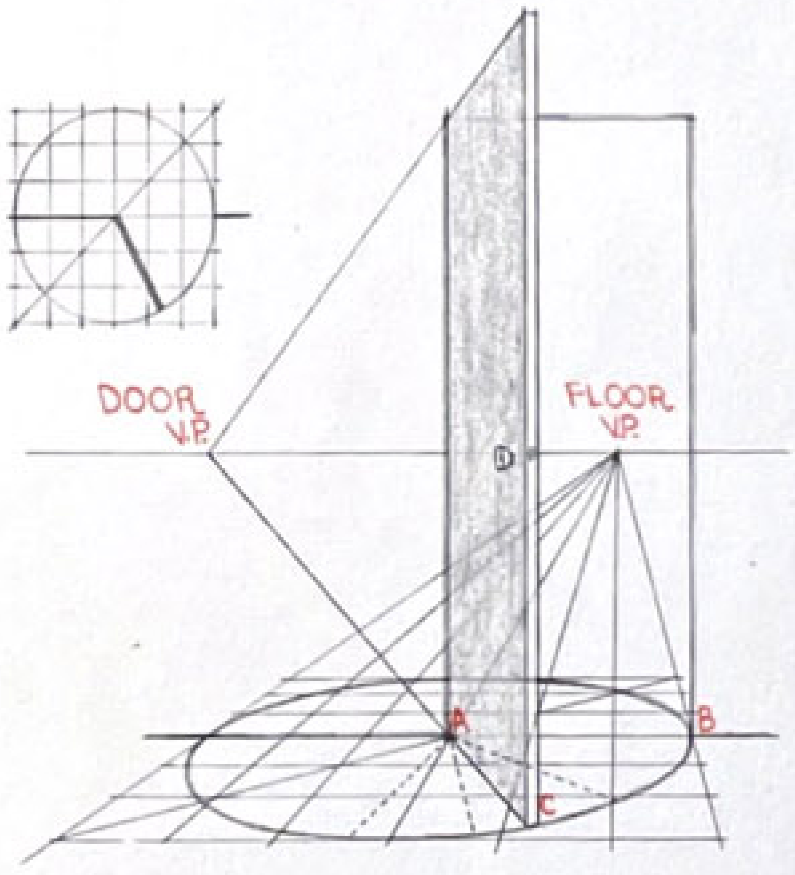
To draw floor tiles in one point perspective you have to make a calculated guess at the width and depth of the first tile, the darkest tile. The two sides of the first tile are then projected back until they meet. The point where they meet is the vanishing point from which you draw the horizon line. Lines C D and E F are the front and back edges of the first tile, extended so they can be used as the fronts and backs of other tile in the front row.

Next you divide line C D into equal spaces using the width of the first tile, (the space between A and B), as the measurement. Following this you extend perspective lines from all of these points back to the vanishing point on the horizon. Now all the tiles in the first (front) row are indicated. To construct the remaining tiles, draw a line, G H, cutting one of the front row tiles in half on the diagonal. Extend this line across the entire floor. Every place line G H touches a perspective line, for example at K, you add a horizontal line. The combination of the perspective lines and the horizontal lines show the tile pattern as it appears to get smaller and smaller near the horizon. If you want more tile off toward the horizon, you can draw another diagonal line similar to G H, but start it at M.

When drawing the details on a circular object you use a simplified form of plan projection. Study the demonstration. First the artist measured the width of the cup and then, following this measurement, used a compass to draw a perfect circle above the cup. Next he divided the circle in half with a horizontal line. He then divided the half circle to correspond to the number of decorations on his sketch of the cup.

Take special notice that the divisions are all perfectly equal at the rim or edge of the circle, but as they are projected down onto the cup their width varies. This changing width shows how the design appears to diminish as it goes around the cup's cylindrical form.





Artwork by George Terp

Before drawing this door in perspective, we made a top view plan to study the door's size and movement. In this plan each square represents one foot. Because the average door is three feet wide and can make a circular swing six feet in diameter, our top view plan is six feet (squares) wide by six feet (squares) deep. Next we drew the swing of the door in perspective on a tile floor pattern six squares wide by six squares deep. This floor was drawn in one point perspective using the same method you have just studied. With the top view as a guide, we drew the circular path on the tile floor. You can see that it now appears as an ellipse. The front half of this ellipse represents the path of the outside edge of the door.

At the center of the ellipse, point A, we measured over three squares for the width of the door opening, A to B. Next we completed the opening to accommodate an average seven foot door. We sketched the open door next. Notice that the front edge of the door (C) just touches the rim of the ellipse. A perspective line extended from this front edge, through A, and back to the horizon line, establishes the bottom angle of the door. The perspective line extended from the top of the door also comes to this V. P. However, if the door were open at a different angle (notice the dotted lines on the floor), this vanishing point would move to a new place on the horizon line. The new V. P. would also change the top and bottom angle of the door.

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